

# JOURNAL of the American Veterinary Medical Association

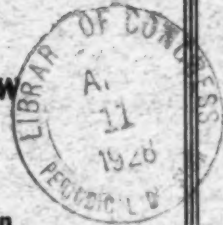
FORMERLY  
**AMERICAN VETERINARY REVIEW**

(Original Official Organ U. S. Vet. Med. Ass'n.)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

INDEX NUMBER



## CONTENTS

Editorial.....	979
Applications for Membership.....	985
Coming Veterinary Meetings.....	989
<b>Papers:</b>	
The Veterinary Situation at Washington—John R. Mohler.....	990
Studies on Infectious Enteritis in Swine. II. The Pathogenesis of Infectious Enteritis (With 8 figures in color)—H. E. Blester, Chas. Murray, S. H. McNutt and Paul Purwin.....	1003
The Control of Rabies by Prophylactic Vaccination—A. Eichhorn.....	1023
Johnin as a Diagnostic Agent in Paratuberculosis—H. K. Wright.....	1036
Results Obtained by the Use of Johnin in Cattle—Henry W. Turner.....	1061
A Possible Cure for Johnie's Disease—W. W. Williams.....	1070
<b>Clinical and Case Report:</b>	
Report on Cow Affected with Johnie's Disease Exhibited at A. V. M. A. Clinic—J. Allyn Rogers.....	1073
Army Veterinary Service.....	1074
Miscellaneous.....	1076
Association Meetings.....	1078
Necrology.....	1096
Personals.....	1102
Index.....	i-viii

Communications relating to publication, subscriptions, advertisements and remittances for the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, as well as matters pertaining to the American Veterinary Medical Association and membership, should be sent to Dr. H. Preston Hoskins, Secretary-Editor, 716 Book Bldg., Detroit, Mich.

\$4.00 per annum

Foreign \$5.00; Canada \$4.25

Single Copies 40 cts. in U. S.

# **FOWL CHOLERA & TYPHOID MIXED BACTERIN**

**Made by Dr. A. A. LEIBOLD**

The two diseases, Fowl Cholera and Fowl Typhoid, are frequently confused, as they resemble each other somewhat. Our Fowl Cholera and Typhoid Mixed Bacterin is used with great advantage in these cases where an absolute diagnosis cannot be made. In this way immunity is produced against both and the veterinarian is saved much time and annoyance. It is a reputation builder.

*Write for prices and further information.*

**W. F. Straub Laboratories, Inc.**

**(Successors to Zell-Straub Laboratories)**

**5520 Norwood Park Ave.**

**CHICAGO, ILL.**

**Biologics — Pharmaceuticals — Specialties**







**JOURNAL**  
**OF THE**  
**American Veterinary Medical Association**  
**FORMERLY AMERICAN VETERINARY REVIEW**

(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit, Mich.

REUBEN HILTY, President, Toledo, Ohio.

M. JACOB, Treasurer, Knoxville, Tenn.

**Executive Board**

GEO. HILTON, 1st District; T. E. MUNCE, 2nd District, Chairman; D. S. WHITE, 3rd District  
J. R. MOHLER, 4th District; C. H. STANGE, 5th District; GEO. H. HART,  
6th District; R. S. MacKELLAR, Member-at-Large

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

Reprints should be ordered in advance. Prices will be sent upon application.

Vol. LXXII, N. S. Vol. 25

April, 1928

No. 7

**EXTENSION WORK THAT HELPS THE PROFESSION**

It is pleasing to note the constantly increasing number of occasions when veterinarians meet with dairymen and other owners of live stock, for the purpose of addressing them on the subject of the control of animal diseases. The practice has much that is commendable and veterinarians should not pass up a single opportunity to take places on the programs of meetings of farmers, breeders and live stock owners. It is one of the best ways of advertising the veterinary profession that we know of and nowadays, when so much is being said about the desirability of more publicity for the profession, we think it timely to direct attention to this particular method because there can be no question that it has been neglected in the past. The following specific examples will serve to illustrate what we have in mind.

In January more than one hundred dairymen met with the Bucks-Montgomery Veterinary Club members, at Doylestown, Pa., for the purpose of discussing the control of abortion disease. Dr. M. F. Barnes, Director of the Pennsylvania Bureau of Animal Industry Laboratories, reviewed the research work done on abortion since the discovery of the causative organism of the disease. Among other things, Dr. Barnes said that it had not been necessary to make any radical changes in the original basic principles laid down for the successful control of the disease by the late Dr. Leonard Pearson, more than twenty years ago.

Dr. Barnes stressed the importance of sanitation and stated that the use of vaccine had not yet eradicated abortion from a single herd of cattle. Dr. H. R. Church, Deputy State Veterinarian, then reviewed the progress that had been made in controlling abortion in Pennsylvania. He explained the Pennsylvania plan and reported that, during the year 1927, more than 25,000 blood tests had been made on Pennsylvania cattle for the purpose of detecting the infection. Dr. J. N. Rosenberger, of Philadelphia, followed Dr. Church and reported the results that had been obtained in the herds on twenty-two demonstration farms in the State. These herds were divided into two groups. The first group, consisting of seven herds, contained cattle that had been raised by their owners almost exclusively and these showed considerably less infection than the other group, consisting of fifteen herds, these being made up very largely of cattle purchased by their owners from various sources. The first group showed about 10 per cent infection, whereas the latter group showed about 35 per cent. Dr. Rosenberger showed very conclusively that the breeding and milk-production efficiency decreased directly in proportion as the amount of infection in the herd increased. Dr. R. S. Amadon, of the University of Pennsylvania, then addressed the meeting on the subject, "The Physiology of the Reproductive Organs of Cattle." A general discussion followed the addresses of the four veterinarians.

From away out near the Pacific Coast comes a report of another meeting very much similar to the one held in eastern Pennsylvania. On February 1 and 2, 1928, the Oregon Dairymen's Association held a joint meeting with the Multnomah County Breeders School at Fairview, Ore., under the auspices of the Oregon Agricultural College Extension Service. The dairymen and breeders were addressed by the following veterinarians on the subjects named: Dr. B. T. Simms, of the Oregon Agricultural College, "Anatomy and Physiology of the Reproductive Organs of the Cow," "Infectious Abortion," and "Care of Freshening Cow and New Born Calf—Udder Troubles"; Dr. W. B. Coon, of Forest Grove, Ore., "Preventing Breeding Troubles in the Bull"; Dr. C. R. Donham, of the Oregon Agricultural College, "Sterility in the Female"; Dr. W. H. Lytle, state veterinarian of Oregon, "Livestock Sanitary Board Program for Abortion Control." We are advised that this program was the result of a cooperative effort upon the part of Dr. C. H. Seagraves, of Oregon City, and his county agent.



At the annual meeting of the Pennsylvania Association of Dairy and Milk Inspectors, held at Harrisburg, Pa., in January, Dr. S. E. Bruner, of the Pennsylvania Bureau of Animal Industry, addressed the members on the subject of "A General Survey of Pennsylvania's Bovine Tuberculosis Eradication Work." At the same meeting, Dr. W. A. Snyder presented a paper on the subject of "Dairy Stable Ventilation as a Factor in the Construction and Remodeling of Dairy Barns."

At the annual meeting of the Pennsylvania State Poultry Association, held in Harrisburg, January 18-19, Dr. J. J. Black, of Vineland, N. J., delivered papers on the following subjects: "Disease Problems Facing Commercial Poultrymen" and "Hatching Results from Breeders Reared and Constantly Left in Confinement."

At the annual meeting of the Pennsylvania Dairymen's Association, held in Harrisburg, in January, Dr. E. S. Deubler, of Narberth Pa., presented a paper, entitled, "A Practical Plan for Ridding the Herd of Contagious Abortion."

Canadian veterinarians are aware of the value of such contacts. This is evidenced by the fact that Dr. A. E. Cameron, of the Health of Animals Branch, Dominion Department of Agriculture, addressed the Dairymen's Convention, held at Winnipeg, January 24-25-26, on the subject of "Contagious Abortion." On the same occasion, Dr. M. T. Lewis, a practitioner of Stonewall, Man., delivered a very interesting discourse on "Cattle Diseases."

Undoubtedly there have been other occasions when veterinarians addressed similar meetings along the same lines as those described above. We will be very glad indeed to record any such occasions in the JOURNAL, if they are reported to us. This kind of publicity, extension work or whatever you choose to call it, helps the veterinary profession and particularly the practitioner. Let us have more of it. It would be possible for us to take several pages to tell our reasons for believing that extension work of this kind is preferable to much of the instruction in veterinary subjects now being taught in some of our agricultural colleges. We may enlarge upon this theme at some later date.

---

#### NATURALLY

Dr. Pammel said persons and animals eating cowbane frequently have conclusions.—*Des Moines Tribune*.

## TWO VETERINARIANS RECEIVE UNUSUAL HONOR

A most unusual honor was recently conferred upon two veterinarians of the Keystone State—Drs. M. F. Barnes and E. C.



DR. M. F. BARNES

Deubler. The honor consisted of the election of this pair of young veterinarians as two of the twenty-five "Outstanding Dairymen" in the United States, by the senior class of Pennsylvania State College. They were elected to this "Roll of Honor" for rendering "Distinguished Service" to the dairy industry, along with twenty-three others, selected from a group of 134 names first selected in a thorough canvass of the entire country. Professor A. A. Borland, of the Department of Dairy Husbandry, announced the result of the election by telegraph.

Some interesting facts have been unearthed in digging up the life histories of Doctors Barnes and Deubler. In the first place, they were both born in Pennsylvania, Barnes in the north-western part, near Sandy Lake, and Deubler in the northeastern part, at Tunkhannock, in both cases on farms in more or less undeveloped sections of the State. Each of them can boast of having had a father possessed of a good share of common sense and an integrity that was never questioned by men who knew them.

Barnes was born March 24, 1888, and Deubler first saw the light of day on August 21, 1889. The fall of 1908 found both of them enrolled as freshmen at the University of Pennsylvania School of Veterinary Medicine. They soon became fast friends and their careers have closely paralleled each other for a score of years. Inclined to athletics, Deubler was stroke of the Veterinary Department Crew in 1910. More of a studious bent,



DR. E. C. DEUBLER

Barnes won the Anatomy Prize the same year. While they were senior students, Deubler and Barnes received appointments as assistant resident surgeons at the Veterinary Hospital.

Upon receiving their diplomas in 1911, both secured appointments immediately, Barnes as Resident Surgeon at the Veterinary Hospital and Deubler as veterinarian-in-charge of the Experiment Farm of the Pennsylvania State Live Stock Sanitary Board, under the direction of Dr. K. F. Meyer. A year later Barnes went out to the farm to help Deubler. The latter's next move was to take charge of several dairy farms in the vicinity of Philadelphia and build up a highly specialized and incidentally very lucrative practice. Upon Deubler's leaving the Experiment Farm, Barnes was placed in charge.

In 1914 Barnes went to the North Dakota Agricultural College as an assistant to Dr. L. Van Es, to whom he gives much credit for causing him to have a less obscure vision of the future of veterinary science. Two years later he returned to Pennsylvania and located at Franklin, where he engaged in private practice for two years. He then returned to the Pennsylvania State Live Stock Sanitary Board, which later became the Pennsylvania Bureau of Animal Industry.

At about this time Barnes and Deubler were again thrown in contact and they have been coworkers of the most earnest type ever since. Barnes has worked in the laboratory one day and in the field the next. Deubler has confined his activities to the practical side of things, disease control on the farm, breed improvement and dairy farm management. Each man has supplemented the needs of the other, both with the hope that they might contribute something toward the improvement of the live stock industry from the health standpoint. Their efforts are already bearing fruit. Time will magnify the benefits of their true and useful service to the owners of live stock.

Just now Deubler is manager and half-owner of the first certified "abortion-free" herd under the Pennsylvania Plan. He also manages another abortion-free herd and is in charge of the control of abortion disease in a number of widely separated herds, most of which are free of the disease at present.

In 1920 Barnes was appointed to make a special study of methods for the prevention and control of Bang bacillus disease, by Dr. T. E. Munce, Director, Pennsylvania Bureau of Animal Industry, who recognized the necessity of having some sort of a plan for controlling the disease. Since that time a definite

policy has been formulated and followed, based largely on principles worked out by Barnes and Deubler in their cooperative studies.

There is a certain amount of deep-seated satisfaction in knowing that these two young veterinarians have made worthwhile contributions to veterinary science and dairy husbandry, as a result of careful, painstaking, conscientious effort, often in the face of big difficulties and discouragements, but there is even a greater degree of satisfaction in recording the fact that the value of the work of these two men has been recognized in their election to the "Hall of Fame" at Pennsylvania State College.

### PURE SAND

It will be recalled that, while he was president of the American Veterinary Medical Association, Dr. Thomas A. Sigler, of Greencastle, Ind., had his name in the newspapers quite frequently as the result of several automobile accidents. This year it would appear that President Hilty has selected a much less common stunt for securing some newspaper publicity. In connection with his private practice, Dr. Hilty looks after the animals at the Zoo in Walbridge Park, Toledo. As a matter of fact, Dr. Hilty is the official veterinarian to the Zoo.

The latter part of February, one of the black leopards in captivity developed a skin affection and it became necessary for Dr. Hilty to apply an ointment locally. While being treated, the leopard was confined in a cage designed for the purpose. While the treatment was in progress, something went wrong. The first thing that Dr. Hilty and the attendants knew was that the leopard was half-way out of the cage. The attendants made a dash to get a crate into which they expected to entice the leopard. They left Dr. Hilty "holding the bag" or, more correctly, holding the leopard. Quick to size up the situation, Dr. Hilty grabbed the only part of the anatomy of the leopard that was available—the caudal appendage. By a Herculean effort, he was able to maintain his grip on the leopard's tail in such a way as to immobilize the animal partly. The anterior one-half of the leopard was outside of the cage and trying to get around the front end to get a bite of Dr. Hilty. The latter's grip on the tail, at the psychological moment, was just at a point sufficient to compel the animal to keep its distance until reinforcements arrived.

In relating his experience, Dr. Hilty said that it was the worst predicament in which he had ever found himself and he con-



sidered it about the closest shave that he had ever had. Plans have been drawn for an improved type of cage for restraining wild animals at the Toledo Zoo during treatment. Dr. Hilty suggests to any fellow practitioners, who may be called upon to administer any salve to wild animals, that it would be a good idea to see that everything is air-tight before starting the treatment.

This article might have been headed, "The Tail of a Leopard," had the incident not been such a splendid exhibition of pure sand. We are glad to report that our President came through the ordeal without even a scratch.

### APPLICATIONS FOR MEMBERSHIP

See October, 1927, JOURNAL

#### FIRST LISTING

- BECKMANN, WILHELM E. 3604 Loughborough Ave., St. Louis, Mo.  
D. M. V., University of Giessen, 1904  
Vouchers: Joseph T. Jennemann and Andrew Darling.
- BOWERS, WM. O. Spring Valley, Ohio  
D. V. M., Ohio State University, 1915  
Vouchers: D. M. Swinehart and O. V. Brumley.
- BROBECK, IVAN J. Richwood, Ohio  
D. V. M., Ohio State University, 1904.  
Vouchers: O. V. Brumley and D. M. Swinehart.
- BROWN, JAMES THOMAS 510 E. D St., Belleville, Ill.  
D. V. M., Kansas City Veterinary College, 1915  
Vouchers: V. W. Myers and H. R. Schwarze
- BUNNELL, WM. A. Miamitown, Ohio  
D. V. M., Cincinnati Veterinary College, 1914  
Vouchers: D. M. Swinehart and O. V. Brumley.
- CLARK, WM. R. Wauseon, Ohio  
V. S., Ontario Veterinary College, 1898.  
Vouchers: D. M. Swinehart and O. V. Brumley.
- DABBELT, A. H. 504 W. Main St., Coldwater, Ohio  
D. V. M., Cincinnati Veterinary College, 1915  
Vouchers: D. M. Swinehart and Reuben Hilty.
- DEEM, ARTHUR W. R. F. D. No. 3, Delaware, Ohio  
D. V. M., Cincinnati Veterinary College, 1918  
Vouchers: D. M. Swinehart and O. V. Brumley.
- DILTS, CHARLES R. Fremont, Ohio  
D. V. M., Ohio State University, 1904  
Vouchers: D. M. Swinehart and O. V. Brumley.
- ELDRIDGE, BERT C. 202 N. Main St., Swanton, Ohio  
V. S., Ontario Veterinary College, 1902  
Vouchers: D. M. Swinehart and O. V. Brumley.
- EWING, HARRY E. 77 W. Northwood, Columbus, Ohio  
D. V. M., Ohio State University, 1909  
Vouchers: O. V. Brumley and D. M. Swinehart.
- FAUST, J. HENRY 7628a S. Broadway, St. Louis, Mo.  
M. D. C., Chicago Veterinary College, 1905  
Vouchers: J. T. Jennemann and A. Darling.
- FITZPATRICK, J. C. Amelia, Ohio  
D. V. M., Cincinnati Veterinary College, 1913  
Vouchers: O. V. Brumley and D. M. Swinehart.

- FOGLE, ALLAN E. 2478 Neil Ave., Columbus, Ohio  
D. V. M., Ohio State University, 1910  
Vouchers: Earl F. Long and D. M. Swinehart.
- GILBERTSON, Henry Madison, S. Dak.  
D. V. M., Kansas City Veterinary College, 1915  
Vouchers: John B. Bryant and W. F. Guard.
- GILL, JOSEPH H. 721 Second St., Portsmouth, Ohio  
D. V. M., Cincinnati Veterinary College, 1910  
Vouchers: D. M. Swinehart and O. V. Brumley.
- HOPKINS, TROY SYRUS Box 2012, Ancon, C. Z.  
D. V. M., Indiana Veterinary College, 1922  
Vouchers: Robt. J. Foster and Chas. B. Dunphy.
- JACOBI, VAN S. Greenville, Ill.  
D. V. M., McKillip Veterinary College, 1918  
Vouchers: H. R. Schwarze and A. E. Bott.
- KEEF, EARL M. 301 Wholesale Terminal Bldg., Los Angeles, Calif.  
D. V. M., San Francisco Veterinary College, 1913  
Vouchers: W. L. Curtis and J. P. Bushong.
- KICKBUSCH, FRANK 342 Superior St., Milwaukee, Wis.  
M. D. V., McKillip Veterinary College, 1904  
Vouchers: H. C. Kornetzky and E. S. Dickey.
- LANGE, J. V. Mechanicsburg, Ohio  
D. V. M., Ohio State University, 1920  
Vouchers: D. M. Swinehart and O. V. Brumley.
- LEASURE, ELDEN EMANUEL Kansas State Agr. College, Manhattan, Kans.  
D. V. M., Kansas State Agricultural College, 1923  
Vouchers: Joseph P. Scott and H. F. Lienhardt.
- LUDWIG, WM. F. Barnesville, Ohio  
D. V. M., Ohio State University, 1914  
Vouchers: D. M. Swinehart and O. V. Brumley.
- LUKENS, WILLIAM R. Hillsboro, Ohio  
D. V. M., Ohio State University, 1912  
Vouchers: D. M. Swinehart and O. V. Brumley.
- LYNCH, LELAND C. 1737 Tytus Ave., Middletown, Ohio  
D. V. M., Ohio State University, 1926  
Vouchers: David S. White and D. M. Swinehart.
- MCCONKEY, CHARLES W. Napoleon, Ohio  
D. V. M., Cincinnati Veterinary College, 1914  
Vouchers: D. M. Swinehart and Reuben Hilty.
- MEIER, FREDERICK D. 838 27th Ave., Milwaukee, Wis.  
M. D. V., McKillip Veterinary College, 1910  
Vouchers: Elvon S. Dickey and Frank J. Scheloski.
- MEYER, LEO P. Convoys, Ohio  
D. V. S., Grand Rapids Veterinary College, 1913  
Vouchers: D. M. Swinehart and H. W. Feldwisch.
- MEYER, OLIVER ALBERT East Alton, Ill.  
M. D. C., Chicago Veterinary College, 1911  
Vouchers: H. R. Schwarze and A. E. Bott.
- MICHAEL, LEO B. Collinsville, Ill.  
M. D. C., Chicago Veterinary College, 1903  
Vouchers: H. R. Schwarze and A. E. Bott.
- MILLER, GEORGE O. Kenton, Ohio  
D. V. M., Ohio State University, 1910  
Vouchers: D. M. Swinehart and Reuben Hilty.
- MORRIS, FRED J. Morral, Ohio  
D. V. M., Ohio State University, 1914  
Vouchers: D. M. Swinehart and O. V. Brumley.

- O'BRIEN, W. S. Ryan, Iowa  
 D. V. M., Chicago Veterinary College, 1912  
 Vouchers: Grant B. Munger and John B. Bryant.
- O'HARRA, WILLIAM G. Camp Chase, Ohio  
 D. V. M., Ohio State University, 1910  
 Vouchers: D. M. Swinehart and C. W. Fogle.
- OWEN, ROGER N. 416 S. Prospect St. Ravenna, Ohio  
 D. V. M., Ohio State University, 1923  
 Vouchers: D. W. Ashcraft and D. M. Swinehart.
- QUIRIN, CHARLES P. Smithton, Ill.  
 D. V. M., McKillip Veterinary College, 1912  
 Vouchers: H. R. Schwarze and A. E. Bott.
- PARMER, H. W. Ida Grove, Iowa  
 D. V. M., Iowa State College, 1919  
 Vouchers: John B. Bryant and W. F. Guard.
- PRIEST, FREDERICK 88 S. Third St., Newark, Ohio  
 D. V. M., Ohio State University, 1895  
 Vouchers: D. M. Swinehart and O. V. Brumley.
- RAGSDALE, HOWARD LEROY Oxford, Pa.  
 D. V. M., Kansas City Veterinary College, 1917  
 Vouchers: J. B. Reidy and Howard H. Custis.
- REDDEN, ELWIN M. Box 259, Norfolk, Nebr.  
 D. V. M., Iowa State College, 1927  
 Vouchers: E. C. Moranville and W. F. Guard.
- REDMAN, W. B. Boxholm, Iowa  
 D. V. M., Iowa State College, 1922  
 Vouchers: John B. Bryant and W. F. Guard.
- ROLIGHED, MARVIN H. Appleton, Minn.  
 D. V. M., Indiana Veterinary College, 1923  
 Vouchers: C. P. Fitch and R. Fenstermacher.
- SATORIUS, GEORGE R. Athens, Ill.  
 D. V. M., Chicago Veterinary College, 1920  
 Vouchers: C. C. Hastings and W. H. Welch.
- SIMPSON, HARVEY LEWIS 739 4th St., San Diego, Calif.  
 D. V. M., McKillip Veterinary College, 1912  
 Vouchers: W. L. Curtis and John L. Tyler.
- SMILEY, RAY S. Cromers, Ohio  
 D. V. M., Ohio State University, 1919  
 Vouchers: D. M. Swinehart and O. V. Brumley.
- SPINDLER, JOHN L. Ashville, Ohio  
 D. V. M., Ohio State University, 1909  
 Vouchers: D. M. Swinehart and O. V. Brumley.
- STANLEY, CARL BLACK Bellville, Ohio  
 D. V. M., Ohio State University, 1915  
 Vouchers: O. V. Brumley and D. M. Swinehart.
- STEVENSON, LIONEL Ontario Veterinary College, Guelph, Ont.  
 B. V. Sc., Ontario Veterinary College, 1926  
 Vouchers: C. D. McGilvray and R. A. McIntosh.
- STORTZ, LEWIS J. Edwardsville, Ill.  
 M. D. C., Chicago Veterinary College, 1908  
 Vouchers: H. R. Schwarze and A. E. Bott.
- WALE, FLOYD S. 2882 Humboldt St., Minneapolis, Minn.  
 D. V. M., Kansas City Veterinary College, 1915  
 Vouchers: M. W. Ray and Ralph A. Hallquist.
- TODD, R. C. 107 Washington St., Delta, Ohio  
 V. S., Ontario Veterinary College, 1915  
 Vouchers: D. M. Swinehart and Reuben Hilty.

- TURPEN, STEPHEN A. 357 W. George St., St. Paul, Minn.  
D. V. M., Kansas City Veterinary College, 1916  
Vouchers: C. L. Hall and G. E. Totten.
- UNDERWOOD, FORREST A. Vaughnsville, Ohio.  
D. V. M., Ohio State University, 1915  
Vouchers: D. M. Swinehart and O. V. Brumley.
- WESTERBERG, RALPH VICTOR Simsbury, Conn.  
B. V. Sc., Ontario Veterinary College, 1927  
Vouchers: Geo. E. Corwin and Edwin Laitinen.
- WILLIAMS, NEWCOMB L. College Corner, Ohio  
D. V. M., Cincinnati Veterinary College, 1913  
Vouchers: R. E. Rebrassier and D. M. Swinehart.
- WILSON, HAROLD E. Arenzville, Ill.  
D. V. M., Chicago Veterinary College, 1919  
Vouchers: A. E. Dickerson, W. B. Holmes and C. C. Hastings.
- WOODS, LEONARD B. Carrollton, Ill.  
M. D. C., Chicago Veterinary College, 1910  
Vouchers: T. M. Bayler and H. R. Schwarze.

### Applications Pending

#### SECOND LISTING

- Abell, A. L., Monroe City, Mo.  
Anderson, Oscar William, 634 Live Stock Exch. Bldg., South St. Paul, Minn.  
Bartholomees, George E., Sheldon, Mo.  
Betty, Curtis Henry, Mattoon, Ill.  
Bowen, David F., Urbana, Ohio.  
Browne, Glenn R., 602 Honeywell Ave., Hoopeston, Ill.  
Chamberlain, Harry D., 1116 Whitney Blvd., Belvidere, Ill.  
Christian, John Robert, Woodhull, Ill.  
Cissell, F. L., Perryville, Mo.  
Crabtree, J. S., Danville, Ill.  
Dickerson, A. E., 225 E. Washington St., Springfield, Ill.  
Doherty, L. A., 426 23rd Ave., Milwaukee, Wis.  
Downey, Harry L., Martinsville, Ill.  
Eakins, Horace S., Camp Gatun, C. Z.  
Evenson, George Ernest, West Salem, Wis.  
Fritchen, Frederick J., Franksville, Wis.  
Garman, Roy James, 203 Administration Bldg., Union Stock Yds., Los Angeles, Calif.  
Gieske, E. E., Wheeling, Ill.  
Grigsby, Paul S., Louisiana, Mo.  
Hammonds, Charles E., Girard, Ill.  
Hickey, John Edward, Juneau, Wis.  
Hickman, Harry Bernice, Box 14, Malta Bend, Mo.  
Hinds, Harry, Palmyra, Mo.  
Hook, C. N., Braymer, Mo.  
Hueben, Frank W., Houstonia, Mo.  
Jerome, J. Newell, Ulrich, Mo.  
Jones, J. Leslie, Blackburn, Mo.  
Keyes, Homer Orville, 203 Administration Bldg., Union Stock Yds., Los Angeles, Calif.  
Lueckert, C. Lee, Blackwater, Mo.  
Morgan, David B., Neosho, Mo.  
Morris, James, Logan, Iowa.  
Pemberton, Clarence C., Liberty, Mo.  
Pogoriler, Joseph, 1172 Lincoln Ave., St. Paul, Minn.  
Richardson, D. F., Hoopeston, Ill.  
Robinson, Egbert W., 80 Atkinson St., Bellows Falls, Vt.  
Schneidman, Samuel A., 207-19 Jamaica Ave., Bellaire, L. I., N. Y.  
Seevers, Fred L., Pleasant Hill, Mo.



Shipp, Reuben S., Cameron, Mo.  
Spesard, W. R., Shelbyville, Ill.  
Suits, Franklin H., Odessa, Mo.  
Tomlinson, George Rolland, 634 Live Stock Exch. Bldg., South St. Paul, Minn.

### Reinstated

De Tray, E. M., Napoleon, Ohio.

The amount that shall accompany an application filed this month is \$8.75, which covers membership fee and dues to January 1, 1929, including subscription to the JOURNAL.

### COMING VETERINARY MEETINGS

New York City, Veterinary Medical Association of. Academy of Medicine, 5th Ave. & 103rd St., New York, N. Y. April 4, 1928. Dr. C. P. Zepp, Secretary, 128 W. 53rd St., New York, N. Y.

San Diego-Imperial Veterinary Medical Association. San Diego, Calif. April 4, 1928. Dr. W. G. Oliver, Secretary, 3821 Arizona St., San Diego, Calif.

Chicago Veterinary Society. Great Northern Hotel, Chicago, Ill. April 10, 1928. Dr. J. B. Jaffray, Secretary, 2956 Washington Blvd., Chicago, Ill.

Michigan Livestock Loss Prevention Association. Detroit, Mich. April 10-11, 1928. Mr. O. B. Price, Secretary, 336 Michigan Central Terminal, Detroit, Mich.

Maine Veterinary Medical Association. Bangor, Me. April 11, 1928. Dr. C. F. French, Secretary, 87 Summer St., Rockland, Me.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. April 11, 1928. Dr. H. Preston Hoskins, Secretary, 716 Book Bldg., Detroit, Mich.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. April 17, 1928. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. April 18, 1928. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.

Ohio, Livestock Loss Prevention Association of. Van Cleve Hotel, Dayton, Ohio. April 18, 1928. Mr. Earl G. Reed, Secretary, Columbus, Ohio.

Mid-West States Tuberculosis Conference. Sioux City, Iowa. April 26, 1928.

**THE VETERINARY SITUATION AT WASHINGTON**  
**Report of House Committee on Appropriation Favors**  
**More Liberal Salary Scale for Bureau Veterinarians**

*By JOHN R. MOHLER, Washington, D. C.*

*Chief, Bureau of Animal Industry*

The consideration which members of Congress recently have given the veterinary needs of the country and of the Bureau of Animal Industry should be encouraging to the profession. Testimony on the entire veterinary situation followed the recommendations of the Secretary of Agriculture and the Chief of the Bureau for an increase in its appropriation to provide for more adequate salaries paid to veterinarians in the field service. Full details of the hearings appear in the document, "Hearings before Subcommittee of House Committee on Appropriations, Seventieth Congress, first session." The Committee's full report likewise has been published as Report No. 789.

With the publication of the two documents mentioned, it becomes possible now to acquaint the veterinary profession with the evidence given. Following is a brief summary of the situation up to March 10.

The Subcommittee of the House Committee on Appropriations consists of Congressmen L. J. Dickinson, of Iowa (chairman); Edward H. Wason, of New Hampshire; John W. Summers, of Washington; James P. Buchanan, of Texas; and John N. Sandlin, of Louisiana. The Committee gave attentive consideration to the facts presented, and early in the hearing held Friday, January 20, recognized the significance of a well-manned veterinary profession to the live stock industry of the country.

In the writer's discussion in connection with the Department's recommendations, the following points were made:

The veterinary-inspector vacancies are becoming increasingly difficult to fill because of the decrease in veterinarians eligible.

Despite four civil-service examinations during the year, we had sixteen vacancies at the end of last year.

A further depletion of the forces will have an unfavorable effect on the live stock industry and the public health.

This depletion is partly due to the decreasing number of men studying veterinary medicine.

# OPPORTUNITIES FOR ADVANCEMENT

among Veterinarians and Other Professional Employees - Field Service - July 1, '27

Chart 1  
on the  
Veterinary  
Situation

Branch of department	P-1 Salary \$ 1,860 - 2,400	P-2 Salary \$ 2,400 - 3,000	P-3 Salary \$ 3,000 - 3,600	P-4 Salary \$ 3,600 - 5,000	P-5 Salary \$ 5,200 - 6,000
Animal Industry (Veterinarian - food opportunity to enter but not to advance)	248 employees	940 (most of whom are at or near bottom of grade)	101	22	
Plant Industry - A smaller field but prospects for program are better	21	64		32	2
Weather Bureau - Apportion new material and food production	112	111	98	23	5
Public Roads - Note large number of employees in the 1st grade	38	52	137	80	14
Entomology - Note food prospects for advancement of efficient employees	68	73	65	27	2
Agricultural Economics - Again a satisfactory situation	12	7	18	12	3
Biological Survey - Note fairly uniform number among the grades	15	20	6	6	
Federal Hunt Band - Another of prospects for advancement	61	38	12	1	
Food, Drug & Insect Alms - Again food prospects for food employees	59	54	36	20	3
Dairy Industry - Good salaries for the few employees in this group	4	13	4	3	
Chemistry and Soils - Note uni- form distribution among the grades	1	2	3	2	

This abnormal rate  
is largely due to the  
age of applicants

Employees reach the  
point of advancement  
at a more rapid  
rate

The incentive to study veterinary medicine would be greatly increased if the Department of Agriculture, the largest single employer of veterinarians in the world, would pay more attractive salaries, thereby increasing the general standard of compensation.

These (proposed) promotions in the budget, totaling \$120,620, are distributed among several subappropriations for an adjustment of salaries of veterinarians in the field service. There has been increasing delay during recent years in filling vacancies, owing to the decrease in veterinarians eligible, and the situation in this respect has now become acute.

Despite the fact that special examinations have been held during the past year, there have not been enough men on the eligible list, willing to accept appointment, to keep the force of veterinarians engaged on animal-disease control and eradication and meat-inspection work at its normal required strength. Further depletion of this force, with unfavorable effects on the live stock industry and the public health, will result unless something can be done to hold the trained men now in the service and to induce more veterinarians to seek appointment.

Failure to maintain an adequate force of trained veterinarians in the field will seriously impair the work of preventing the introduction of dangerous foreign animal maladies, thus placing in jeopardy the live stock industry of the country.

The six charts accompanying this article were presented to the Committee with the following remarks:

I have some charts that, with your permission, I will pass around to show in a graphic way the unfortunate and abnormal situation which the Department is asking you to correct.

COMMENTS ON CHART 1. OPPORTUNITIES FOR ADVANCEMENT AMONG VETERINARIANS AND OTHER PROFESSIONAL EMPLOYEES

This chart, reading from left to right, shows the general trend of advancement of professional employees, beginning at grade P-1 and working toward the higher salaries at the right. Reading from top to bottom, the chart shows relative conditions for advancement in the Bureau of Animal Industry and other professional branches of the Department. The figures in the body of the chart show the number of professional employees (field service only) in different grades and in the various bureaus.

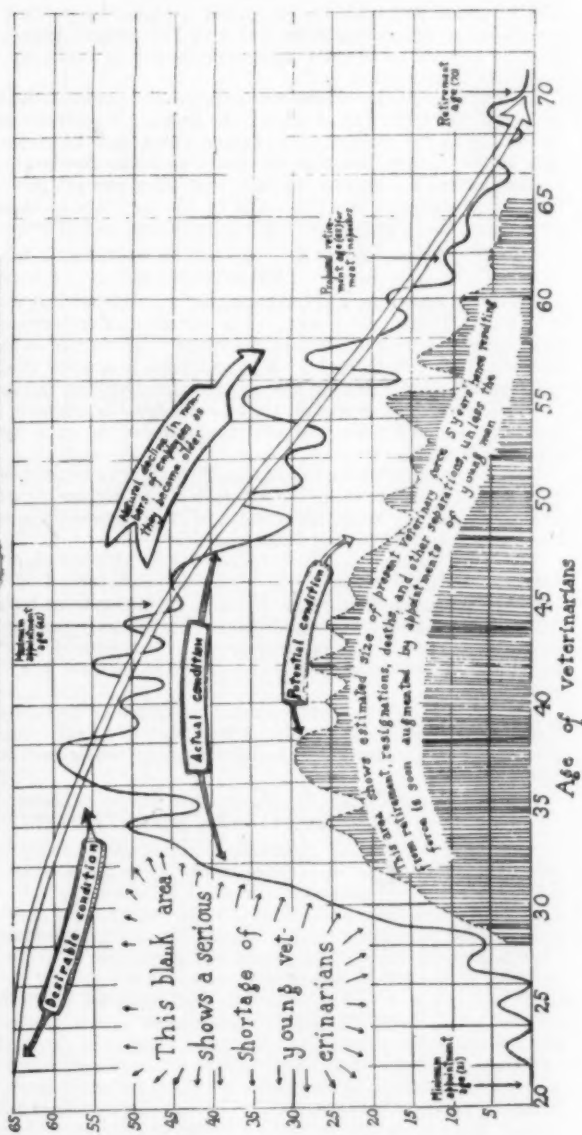
The chart shows clearly a very abnormal condition in the Bureau of Animal Industry. There is an excessive number of employees in grade P-2 in comparison with the other grades and in comparison with conditions in other bureaus. The succeeding grade, P-3, does not provide a sufficient number of positions to make a normal outlet for employees in grade P-2, who are entitled to promotion. This condition has become well known to veterinarians throughout the country and is chiefly responsible for the disinclination of young veterinarians to enter the Bureau of Animal Industry service.



# **Chart 2** **on the** **Veterinary** **Situation** **AGES OF B.A.I. VETERINARIANS** (Based on Records of March, 1937) **Showing Outlook for Maintaining Necessary Inspection Work in Field**

Note: Great deficiency of men under 30 years of age, on whom the future of the service depends. Considerably more than 1/3 of the Bureau's veterinarians are under 30 years old. The area shaded most represents probable result of shortage in personnel in next 5 years.

Number of Veterinarians



All other bureaus in the Department have a much larger proportion of employes in the higher salary grades.

The chart shows clearly the need for a more general distribution of employes in the Bureau of Animal Industry, thus avoiding the congestion in grade P-2 which is assuming a cancerous nature. Providing an adequate outlet, into grades P-3 and P-4, would improve the situation greatly as well as attract more applicants to build up the number of employes in grade P-1.

In this P-2 grade, where the salaries are between \$2,400 and \$3,000, there are 940 men, 625 of whom are drawing \$2,400 salaries. These men have been in the service up to fifteen years, and have not gotten beyond this \$2,400 salary, because we have not the funds to promote them. Under present conditions the only way they can get out of this rank and fill higher positions is when some of the men above them die or resign, permitting these employes to get promotions as supervising inspectors.

#### COMMENTS ON CHART 2. AGES OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS

The chart classifies 1,314 veterinarians in the field service of the Bureau of Animal Industry by age. The number of veterinarians is seen by reading from bottom to top of the chart, and the age of these employes is charted from left to right. For instance, it is seen that the maximum number of veterinarians in any age group is between the ages of 35 and 40.

The chart shows, however, that a considerable majority of the employes are now past 40 years old and the number at each age declines with advancing years.

The blank space at the left of the chart shows a serious shortage of young veterinarians, whereas, in the interest of the service, there should now be in Bureau employ an ample number of men between the ages of 21 and 30 from which to provide for future needs.

The area shaded in black (potential condition) shows what may be expected to happen within the next five years, based on an estimated 10 per cent annual reduction in the force resulting from resignations, retirement, deaths, and other separation. This percentage may be reasonably expected in view of the advancing age of the present veterinary employes and the fact that new appointees are often in their late thirties or early forties.

Briefly, this chart shows that the Bureau's veterinary service will "melt down" very materially in the next few years unless greatly augmented by the training and appointment of young men to fill gaps in the ranks.

#### COMMENTS ON CHART 3. GRADUATES OF ACCREDITED VETERINARY COLLEGES IN UNITED STATES, 1908-1927

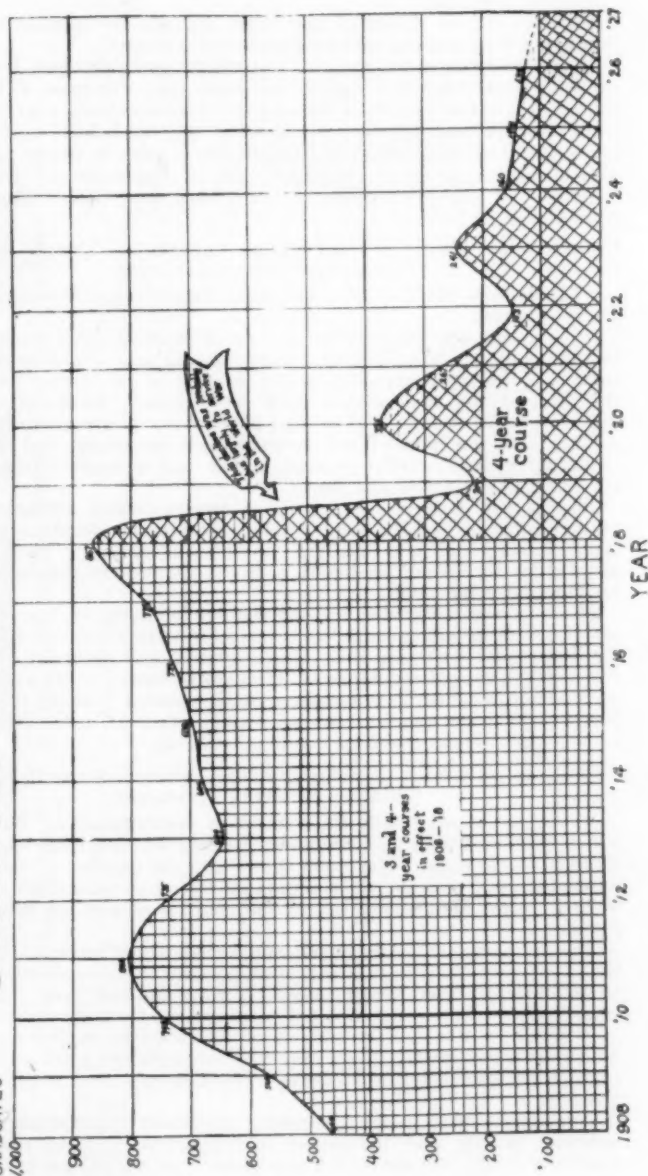
This chart shows by years the number of students graduated from veterinary colleges in the United States from 1908 to 1927. During this period the course of study advanced from three years to four. The present four-year course was established in the interests of more thorough preparation for veterinary work. The four-year course corresponds to a four-year university course and places the graduates of accredited veterinary colleges on a similar professional plane. Aside from the Ontario Veterinary College, in Canada, which in 1926 reported 12 graduates (four-year course), the accredited veterinary colleges in the United States are the only recognized means of training young men for federal and other veterinary service. All of the colleges are now connected with state institutions, in contrast to the early tendency for veterinary education to be given in private colleges. Only 115 students, the smallest number on record, were graduated in 1927. At the beginning of the next college year there will be eleven accredited veterinary colleges in the United States, all of which are state institutions.

#### COMMENTS ON CHART 4. CIVIL-SERVICE EXAMINATION FOR VETERINARIANS

This chart shows, for a period of ten years, the number of applicants for veterinary positions as reported by the Civil Service Commission on

# GRADUATES OF ACCREDITED VETERINARY COLLEGES IN UNITED STATES 1908-'27

**Chart 3**  
on the  
Veterinary  
Situation  
NUMBER OF  
GRADUATES



June 6, 1927. From 1916 to 1921 the position was designated as "veterinarian," and from 1922 to the present time the designation has been "junior veterinarian."

The two curves shown on the chart indicate the number of persons taking the examination and the number who passed.

In general, the chart and the accompanying table show fewer applicants in recent years than eight to ten years ago. The ratio of the number passed to number examined shows some variation from year to year, as would be expected, but does not indicate that the federal need for veterinarians influences markers of examination papers to accept any noticeably larger proportion of applicants than in former years. The greatest frequency of examination was in 1919, 1920, and 1927. There was no examination in 1925.

#### COMMENTS ON CHART 5. NATURE OF VETERINARY DUTIES IN THE BUREAU OF ANIMAL INDUSTRY

This pictorial chart shows a few typical activities in Bureau of Animal Industry work.

As announced in civil-service notices of examinations, employees must be physically fit and able to withstand the cold and dampness of packing-houses, and general exposure to the weather at all times. As shown in the illustrations, some of the work is potentially dangerous, involving exposure to disease, to wild or semi-wild stock, to opposition from stock-owners, and the like. Work in stockyards inspection and other work about stockyards calls for courage, agility, and strength in handling live stock, especially cattle and horses.

Besides the dangers and resulting injuries (which are briefly listed) veterinarians in the Bureau's employ must make decisions that affect large quantities of food and large numbers of animals. They are virtually the final judges of the health of live stock and the suitability of meat for human consumption.

Much of the work also is disagreeable; for instance, the handling of viscera, making intradermic (tail) tests for bovine tuberculosis, working amid the very irritating dust of stockyards, and enforcing the various live stock laws and regulations. Frequently some of this work must be done alone in a hostile atmosphere, with possibility of insult or assault. Briefly, the work requires courage, cool judgment, and physical vigor besides the necessary basic professional training.

#### COMMENTS ON CHART 6. TURNOVER OF VETERINARIANS IN SERVICE OF BUREAU OF ANIMAL INDUSTRY

This chart shows briefly the number of veterinarians on Bureau rolls, which has been a very stable number, ranging between 1,320 and 1,350 for the last seven years. The chart shows also the number of veterinarians appointed each year and those separated each year since 1918. The very large turnover seen at the left of the chart is chiefly the result of war influence.

The net gains and losses during the periods are of interest. Briefly, for the last seven normal years, about 91 appointees have been needed annually to maintain the veterinary force. During the last year (1927) there were fourteen more separations of veterinarians than appointments.

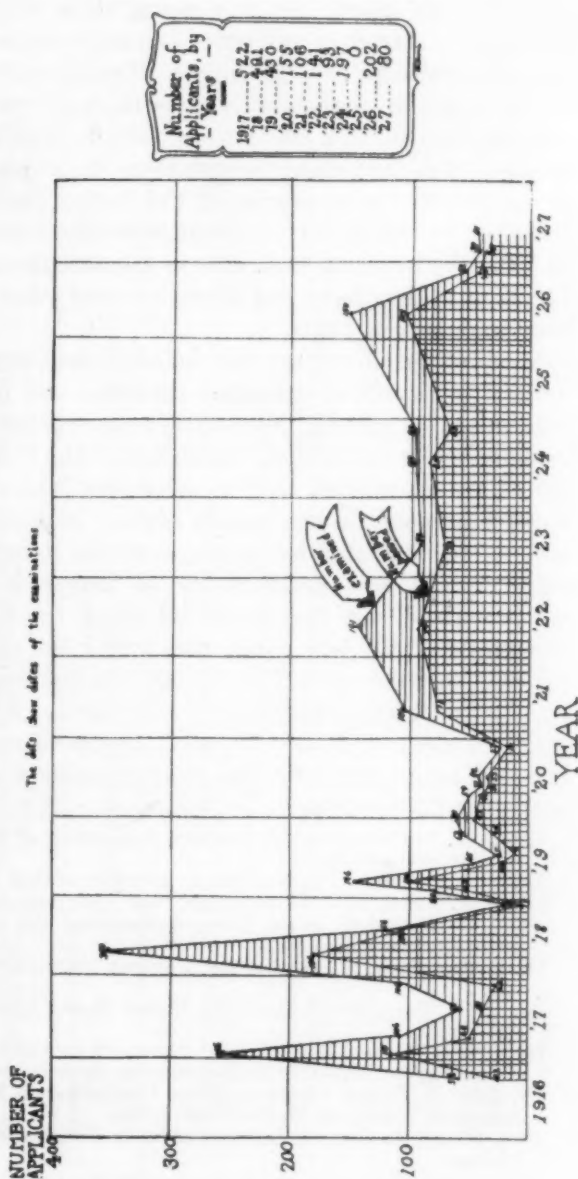
It may be noted that the number of veterinarians on Bureau rolls does not correspond exactly, from year to year, with net gains or losses, the slight difference being a result of reinstatements and other personnel changes.

Comparison with chart 3, showing graduates of veterinary colleges, indicates plainly that the supply is inadequate to meet the demand. Last year (1927) the number of graduates from all colleges in the United States was 115, whereas the needs of the Bureau of Animal Industry alone require 91 of that number. This obviously leaves little opportunity for selection nor allowance for applicants who fail to pass the civil-service examinations, to say nothing of the requirements of private service and city, county and state work.

# CIVIL SERVICE EXAMINATIONS FOR VETERINARIANS

Showing the Frequency of Examinations and the Success of Applicants in Passing Them

Chart 4  
on the  
Veterinary  
Situation



The discussion of the charts and comments resulted in the additional testimony to the effect that \$1,860 has been considered a fair salary, for any young man coming out of any college, as a starter in any profession or business; but he should receive promotions more promptly. The most depressing feature of this condition is that, after he is in many years, he still gets only \$2,400 and then sticks there with so little promise of promotion out of that class, because there are so many men in that group and so few vacancies in the higher positions. It often takes ten or twelve years of additional service before a man gets \$2,500. We have not been able to promote these \$2,400 men to \$2,500 until they have had fifteen or more years of service, just because of lack of funds.

Much of the discussion that followed the foregoing testimony dealt with details of personnel problems and included various suggestions for making promotions more regularly from one professional grade to another. Members of the Committee seemed somewhat dissatisfied and so expressed themselves with the amount proposed in the budget because it provided for promotions of but one step for employes in the lowest grade. I was asked to say how much additional money it would take to advance these men two promotion steps. A hasty calculation showed that \$38,440 additional would be required. Closer figuring fixed the amount at \$39,300, the increase finally allowed by the Committee when its bill was introduced into the House.

On Monday, January 30, the Subcommittee of the House Committee on Appropriations received additional evidence, presented by the following:

George P. McCabe, counsel, National Association of Bureau of Animal Industry Veterinarians.

Dr. E. A. Crossman, representing the field men of that association.

Dr. D. R. Gillies, inspector-in-charge, New York meat-inspection service.

Dean C. H. Stange, Ames, Iowa, representing the eleven veterinary colleges of the United States.

Dr. Reuben Hilty, president of the American Veterinary Medical Association.

Dr. C. A. Cary, president of the United States Live Stock Sanitary Association.

Hon. W. J. Breckenridge, a farmer, who spoke for the live stock interests of Iowa at the request of the Secretary of Agriculture in Iowa.

Dr. John P. Turner, chairman of the Committee on Legislation of the American Veterinary Medical Association.

Hon. Burton L. French, Representative in Congress from the state of Idaho.

The testimony of these well-qualified witnesses pictured conditions in the veterinary profession within the Bureau, in the veterinary colleges, in the Army Veterinary Corps, in state and



# NATURE OF VETERINARY DUTIES IN THE BUREAU OF ANIMAL INDUSTRY

With Special Reference to Personal Hazards and Economic Responsibility

Chart 5  
on the  
Veterinary  
Situation

<p><b>MEAT INSPECTION</b> Involves exposure to diseased tissues, knife cuts, etc.</p>	<p><b>INJURIES OF EMPLOYEES AVERAGE ABOUT 175 ANNUALLY</b> <b>DISABILITY FOLLOWS ABOUT HALF OF THE INJURIES</b>  Principal injuries during last fiscal year were: Cuts, bruises, and infections of hand, Fractures, dislocations, and sprains of arm, Head and scalp injuries, Fractured ribs and injured backs, Broken legs, Death.</p>	<p><b>STOCKYARDS INSPECTION</b> Involves handling fractious cattle, often alone.</p>
<p><b>TUBERCULOSIS ERADICATION</b> Involves working among wild range cattle.</p>	<p><b>RESPONSIBILITIES IN MAKING DECISIONS REST CHIEFLY ON VETERINARIANS AND INVOLVE HUGE AMOUNTS OF FOOD AND FUNDS.</b></p>	<p><b>ERADICATING FOOT-AND-MOUTH DISEASE</b> Inspectors must wear rubber suits, winter or summer.</p>
<p><b>TICK ERADICATION</b> Dynamited dipping vats illustrate opposition.</p>	<p><b>HOG CHOLERA CONTROL</b> A postmortem is no place for weak nerves or faint hearts.</p>	<p><b>LIVE STOCK QUARANTINE WORK</b> Taking blood samples from camel is dangerous but necessary.</p>
	<p><b>ANTEMORTEM INSPECTION</b> Walking slippery fences is incidental to the work.</p>	

county employ, and in private practice. It is deemed inadvisable here to present details of their testimony. I prefer, on the other hand, to leave the opportunity open for the persons mentioned to present their views over their own signatures.

#### THE COMMITTEE'S FAVORABLE REPORT

That the testimony received favorable consideration at the hearings is evident from the report made to the Committee of the whole House to accompany House of Representatives Bill 11577 making appropriations for the Department of Agriculture for the fiscal year 1929. The text of the report, as submitted by Representative L. J. Dickinson, chairman, included the following statements relative to funds for the Bureau of Animal Industry:

The Budget estimates for this Bureau include an increase of \$120,620 for salaries, the purpose of which is to adjust the pay of veterinarians in the field service. The Department finds itself confronted with an acute situation, due to the increasing difficulty experienced in filling vacancies in this service.

Inquiries which have been made developed the fact that there is a tendency on the part of the best men who graduate in veterinary medicine, if they do not enter practice, to seek employment in state, county, or municipal service or in the Veterinary Corps of the Army, due to the more attractive scales of salaries obtaining in those services.

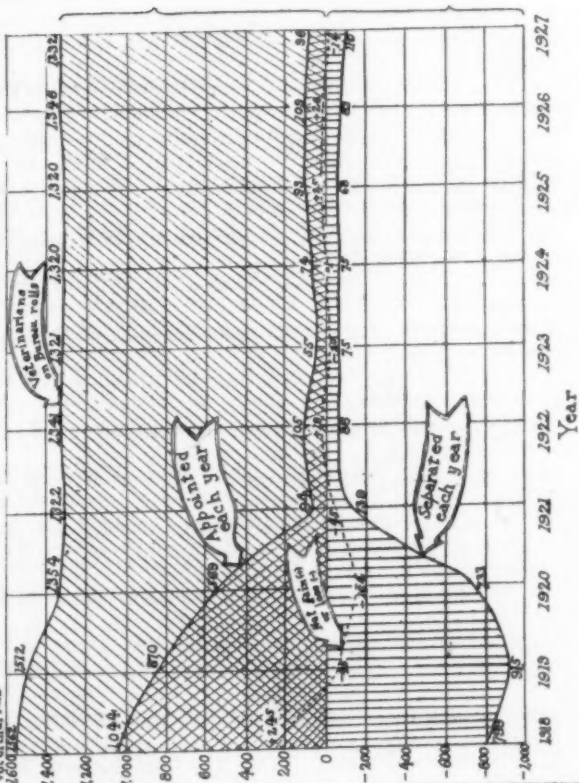
An analysis of the veterinary roll of the Department discloses that the federal service affords but slight opportunity for a career to the graduates of veterinary colleges, so much so that the heads of these schools, according to evidence adduced by the Committee, invariably advise their graduates to seek other fields. This situation is not due to inadequate rates of pay in the various grades, but rather to the excessive number of positions in the middle grades as compared to the number in grades above, which deprives a large majority of those in the service of any hope of receiving a compensation proportionate to their ability and length of service.

The Budget increase of \$120,620 is to be used to bring about a more equitable ratio between the number of lower-paid positions and that of positions in the higher grades, in order to furnish an outlet to employees worthy of promotion. The Committee has approved the budget increase for this purpose, and has provided an additional sum of \$39,300 to rectify a serious condition in the entrance grade, where many efficient employees have had no adjustment of pay for a number of years.

In order not to raise the total of the appropriation act above the sum agreed upon in the financial program of the President, it was necessary to accompany the recommendation for salary advances by a suggestion of an equivalent reduction in some other fund. The indemnities appropriation for tuberculosis eradication was agreed to be the proper fund for this purpose, because, should an emergency produce unlooked for demands, a deficiency appropriation would have a fair chance of approval, whereas an attempt to secure promotion money in a deficiency act would in

# CHART 6 on the Veterinary Situation TURNOVER OF VETERINARIANS IN SERVICE OF BUREAU OF ANIMAL INDUSTRY

Number of  
Veterinarians  
2600/1927



Veterinarians  
on rolls in-  
cluding new  
appointees.

What the Chart Shows  
Appointees needed annually  
to maintain veterinary force  
(based on 1927 normal year)... 91  
Net shrinkage in force in 1927... 149  
Note: Compares with sharp shrinking tendency

Veterinarians  
separated from  
Bureau service

no respect represent an emergency and would have no chance at all.

Should the Senate concur in the House action the result will be an appropriation of \$159,920. I feel like adding that we may consider ourselves fortunate because of the friendly attitude of the Budget Bureau this year, their acquiescence in the recommendations of previous years not having been possible by reason of limitations on the Government's financial program.

### BUREAU TRANSFERS

Dr. Birdwhistle McCormack, from Fort Dodge, Iowa, to Buffalo, N. Y., on meat inspection.

Dr. Warren J. Comstock, from Buffalo, N. Y., to Boston, Mass., on meat inspection.

Dr. M. H. Leininger (K. C. V. C. '11), from Kansas City, Kans., to Omaha, Nebr., on meat inspection.

Dr. John H. Lowe (Iowa '00), from New Orleans, La., to Omaha, Nebr., on meat inspection.

Dr. Ronald A. McDonald (Colo. '23), from Helena, Mont., to Tacoma, Wash., on meat inspection.

Dr. Frank C. Swaney (Chi. '08), from Omaha, Nebr., to Lincoln, Nebr.

Dr. Robert J. Spain (Gr. Rap. '18), from Helena, Mont., to Omaha, Nebr.

Dr. Allen W. Rice (Cin. '12), from Little Rock, Ark., to Fort Worth, Texas, on tick eradication.

Dr. James M. Lawson (K. C. V. C. '10), from Fort Worth, Texas, to Birmingham, Ala., on tick eradication.

Dr. Moses Isaac (Amer. '95), from Jersey City, N. J., to New York, N. Y., on meat inspection.

Dr. Murray J. Myers (O. S. U. '97), from Birmingham, Ala., to Jersey City, N. J., on meat inspection.

Dr. E. P. Schaffter (Ont. '88), from Detroit, Mich., to Los Angeles, Calif., in charge of meat inspection.

Dr. Daniel E. Collins (Iowa '85), from San Francisco, Calif., to Milwaukee, Wis., on meat inspection.

Dr. George Schwamm, from Philadelphia, Pa., to New York, N. Y., on meat inspection.

Dr. Wm. A. Montgomery (McK. '18), from Lincoln, Nebr., to Chicago, Ill.

Dr. Frederick C. Rile (U. S. C. V. S. '20), from Frankfort, Ky., to Chicago, Ill., on meat inspection.

Dr. Charles W. Gates, from tuberculosis eradication to meat inspection, Chicago, Ill.

Dr. Herbert O. Mantor (Iowa '10), from El Paso, Texas, to Phoenix, Ariz.

Dr. Joseph M. Allen (Chi. '91) from Chicago, Ill., to Ogden, Utah, on meat inspection.

Dr. Burnett C. Johnson (U. S. C. V. S. '20), from South St. Paul, Minn., to Fargo, N. Dak., in charge.

Dr. D. J. Byrnacker (U. S. C. V. S. '13), from Jackson, Miss., to Baton Rouge, La.

Dr. Norman C. Wheeler (Chi. '11), from New York, N. Y., to Cincinnati, Ohio, on meat inspection.

Dr. Benjamin H. Yenner (K. C. V. C. '05), from virus-serum control to meat inspection, Indianapolis, Ind.

## STUDIES ON INFECTIOUS ENTERITIS IN SWINE

### II. The Pathogenesis of Infectious Enteritis\*

By H. E. BIESTER, CHAS. MURRAY, S. H. McNUTT and  
PAUL PURWIN

*Department of Veterinary Investigation, Iowa State College,  
Ames, Iowa*

Conclusions which are based upon bacteriological and pathological studies of subjects that have succumbed to a disease extending over a comparatively long period of time may prove misleading. It is possible for a secondary picture to reach the foreground while the primary infection comes to a standstill or even apparently disappears, so that individuals may suffer from a secondary infection and at times die from the same. Several groups of healthy pigs were fed cultures of *Salmonella suispestifer* to determine and trace, if possible, the exact process and reactions leading up to the final lesions, together with the relation of the bacteria involved. Several series of such pigs were destroyed at various intervals, beginning with eight hours after feeding and terminating with 288 hours. In our early studies<sup>1</sup> about 20 cc of a given culture, after frequent animal passages, would prove an infective dose. When the same culture was kept in vitro its virulence was diminished to such an extent that 150 cc would neither kill nor produce advanced intestinal lesions. In the present project it was planned to produce fatal cases in order to obtain subjects in consecutive stages of the disease and not permit recovery. With this in mind, about 250 cc of a culture, which had been kept in vitro a long time and subjected to only two animal passages, was used. This entire amount was not ingested, as broth cultures were mixed with the feed, resulting in some waste. In order to obtain some idea as to the rapidity with which cultures fed test pigs reached the cecum and large colon, various test materials were fed and the time of their appearance in the feces observed. Glass beads given in bran slop appeared in the feces 28 hours or sooner after feeding and disappeared after 72 hours. Oats were being eliminated 41 hours after feeding and disappeared after 89 hours. Methylene blue appeared in traces on the outside of voided feces about 26 hours after feeding. About 75 hours after feeding, this dye was not recognized grossly in the

\*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

excreta. The laxative properties of bran in contrast to the heavy cellulose content of oat-hulls might explain the difference in the time of appearance and elimination between these two agents. The irritating properties of a broth culture of *S. suispestifer* undoubtedly stimulate peristalsis so that the organism probably reached the cecum and large colon in considerably less time than 24 hours, since glass beads were voided in 28 hours or sooner.

#### STOMACH

In this series the stomach showed inflammatory changes of increasing intensity up to 152 hours after feeding the broth cultures. The intensity of the reaction had receded and regenerative processes began to manifest themselves before the 288-hour period. However, in no case was a true diphtheric membrane formed. Up to 32 hours, the principal alteration took place in the chief or adelmorphous cells. The cytoplasm was disintegrated and in some instances the nuclei were in advanced stages of retrogression. The surface epithelium had undergone cloudy swelling and most cells were in a hydropic condition, but the mucous membrane was still intact. Edema of the interstitial tissue was also manifested. Beginning with 56 hours, the circulatory changes were most pronounced along the greater curvature of this organ. The mucosa in this portion was light red, mottled with areas presenting a gray, cooked appearance covered by a thin coat of mucus which was somewhat turbid. Microscopically, desquamation and necrosis as well as congestion and leucocytic infiltration characterized these gross pictures. In a few instances, isolated rod-shaped organisms were invading these areas of desquamation and necrosis. The intensity of this picture increased in the 80-hour subject, desquamation and erosion having progressed to a point where mucosal blood-vessels were exposed to the lumen. Grossly, the mucosa presented a gray, cooked appearance, quite rough, and peppered with numerous red dots. The picture remained about the same until the 104th hour. At this time a whitish-gray exudate developed on the mucous membrane. This could readily be removed, leaving a denuded surface.

Microscopically the exudate was composed of leucocytes, epithelium and mucofibrinous material. Considerable focal and diffuse karyorrhexis was present. Diffuse interstitial cellular infiltration was noted. The bacterial picture was more advanced than in the previous groups, i. e., *suispestifer*-like rods were present



in karyorrhectic zones near the muscularis mucosa. *Actinomyces necrophorus* was not present in such numbers as to be recognized upon direct examination of pathologic sections. At 128 and 152 hours, the lesions were even more advanced, the cellular infiltration and erosion of mucosa being more severe. During this period mixed flora, suipestifer-type and some necrophorus-like organisms were found in the sections studied, but not at all characteristically arranged as in the typical intestinal lesions. In the 176- and 288-hour stages the inflammatory reaction appeared diminished and it seemed the old lesions were healing, possibly never having been as advanced as in previous cases. In these subjects necrosis of the mucosa was not observed.

#### GASTRIC LYMPH-NODES

From the 16th to the 56th hour, edema and leucocytic infiltration were noted, while the germ centers were enlarged. Congestion appeared first in the periphery of the nodes. About the 56th hour, several foci of early karyorrhexis were observed in the periphery. By the 64th hour, a few rod-shaped masses appeared in the cytoplasm of leucocytes. Some were also noted in the follicles. Beginning with 80 hours, varying amounts of focal karyorrhexis were associated with the balance of the cases. After this period suipestifer-type rod-like masses were found in foci of necrosis. The germ center reactions were quite prominent in the latter part of the series, characterized by enlargement and endothelioid cell proliferation, some showing cytoplasmic fragmentation.

#### ILEUM

Early inflammatory changes were already manifest in the eight-hour subject. Congestion and edema were recognized grossly, while slight desquamation was noted microscopically. Leucocytic infiltration of the ileum was well established. In some preparations mucin was demonstrated in the goblet-cells and some in the lumen, but it did not react sharply with the differential stain. It is possible that a part of the exudate was composed of a serous fluid, which diluted the mucin, this interfering with the intensity of the specific stainability of the latter. One must associate this with the outpouring of body fluids into the intestinal lumen during diarrheas. The concentration of the blood elements in spite of intestinal hemorrhage, as was shown by increased red-cell counts during the early stage of the diarrhea, seems to confirm this. At the 16th hour the changes enumerated

above were also present but in a more advanced degree. A few suipestifer-like rods and others were situated at points of desquamation and erosion. In this case the exudate as observed grossly appeared to be of mucous composition, but here again none could be demonstrated free in the lumen by means of microchemical methods. The mucin stain, however, functioned specifically since mucin in desquamated goblet-cells and in those in situ was stained intensely.

At the 32nd hour the gross inflammatory and exudative changes were slightly more advanced than in the 16th hour. Microscopically, it was found that the cellular infiltration of the wall played a large part in the production of swelling. In some sections mucin appeared in large pools in the exudate although indifferently stained by the specific stain. The bacterial picture presented only a few suipestifer-like organisms in areas of desquamation, although at this stage *S. suipestifer* could be isolated from the mesenteric lymph-nodes of the small intestine. By the 56th hour, the active hyperemia had reached its peak and began to change into a passive process. The other processes showed no pronounced progression. However, cloudy swelling and cytoplasmic fragmentation were observed. No significant bacterial invasion could be demonstrated by direct histologic methods. Although this organ was studied in each subject in detail, it will not be necessary to describe individual cases.

From the 80th hour on, the process of leucocytic infiltration became more advanced, although not in orderly progression. In some of the later subjects, 128-, 152- and 176-hour cases, a large part of the swelling was produced by cellular invasion as well as by edema and congestion. While the reaction as a whole showed a steady increase in the intensity of the various inflammatory processes, this fact is not so significant as the end result compared with that in the large intestine. The ileal lesions presented extensive retrograde alterations, sometimes in the form of early, shallow karyorrhexis. The process, however, never extended to the point of definite well-established caseation necrosis or croupous membrane formation in this series. The bacterial invasion seemed to be very slight as compared with the process in the large intestine. Anaerobic conditions such as are created by the presence of a caseated membrane on the surface did not prevail and at no time was a typical alignment of suipestifer and necrophorus-like organisms found, although the two were often present in the same focus. In some of the later subjects in the series,

mucin was found in large quantities microscopically, while absent in others.

#### MESENTERIC LYMPH-NODES OF SMALL INTESTINE

At the eighth hour, edema and hyperemia were found upon gross examination. Histologic study showed that the edematous fluid was lost but cell separation appeared. The follicular germ centers were enlarged, presenting a definite endothelioid cell proliferation. A beginning leucocytosis appeared in foci around the trabeculae. In the 16-hour period, the processes described above were much more advanced, especially that of leucocytosis. Small foci of karyorrhexis of short duration were added to the pathological picture. By the 32nd hour, the nodes were very much enlarged, reddened and gelatinous (fig. 3). A blood-tinged, turbid fluid flowed from the cut surfaces. After scraping off this fluid, the cut surface presented a gray and yellowish-gray mottled appearance. In addition to confirming the gross alterations described, microscopic study proved the mottling to be the result of extensive foci and fields of karyorrhexis and leucocytosis. The germ center reaction was advanced, occupying the greater part of the follicle. This reaction consisted of advanced endothelioid cell proliferation and cellular retrogression in the center of the affected follicles. Some slides contained rod-shaped masses resembling *suipestifer* organisms. Cultural methods regained *S. suipestifer* from these nodes. The small intestinal mesenteric lymph-nodes of all subsequent subjects were positive to cultural methods. These changes continued to advance, so that, by the 88th hour, the nodes were tremendously swollen, gelatinous and greatly mottled. They were very juicy, and fluid flowed freely from the cut surface. The microscopic picture showed extensive fields of dense leucocytosis and necrosis (fig. 4). The endothelioid proliferation extended almost to the periphery of the follicles. Cytoplasmic fragmentation was noted centrally. Isolated *suipestifer*-like rods and clumps were demonstrated in specially stained preparations. As stated previously, cultural methods were positive. The lymph-nodes of subsequent cases were characterized by this general picture with slight deviations and additional lesions of necrosis. In general the active congestion became passive. Cellular disintegration in the form of karyorrhexis became more advanced, together with early caseation, some of the nodes of the later subjects in the series containing considerable caseation. When the congestive changes had reached

their peak, fibrin was frequently found extravascularly in foci. A general disturbance of cell balance was observed in some of the later cases in the series, as indicated by imperfect specific stainability of nucleus and cytoplasm. The degree of alteration in this reaction, provided tissues are handled properly and taken immediately after death, is an indication of the degree of deviation from normal prior to the appearance of morphological alterations. Loss or impairment of organic function can take place before morphological changes in the form of cytoplasmic fragmentation or necrosis appear. Our data show that in the feeding of relatively large doses of the *S. suispestifer*, this bacterial agent invades the intestinal tissue, mesentery and mesenteric lymph-nodes in about 24 hours or less.

#### CECUM

##### 8 Hours

Neither gross nor microscopic cellular changes were present. The cecum in this subject had the appearance of a normal organ.

##### 16 Hours

Gross changes were not recognized at this stage. Microscopic study revealed isolated foci of desquamation, some of which were apparently of mechanical origin, occurring during the technic of preparation of sections. Leucocytes were increased in number but not enough to be termed pathological.

##### 32 Hours

*Gross:* At this point gross changes were manifest by a slight degree of edema and the contents beginning to adhere to the mucosa.

*Microscopic:* Desquamation was pronounced. Shallow erosions of the mucosa, together with cytoplasmic fragmentation were observed. Edema was quite noticeable. There appeared no exudate in the lumen, but the outer zone of the mucosa was infiltrated by leucocytes (fig. 5). One preparation showed several fairly large deep foci of karyorrhexis.

*Fibrin:* Negative.

*Mucin:* Some mucin appeared on the mucosa and in the contents above. Goblet-cells and crypts contained a fairly large amount of this element.

*Bacteria:* *Suispestifer*-like rods and some larger organisms suggestive of *Actinomyces necrophorus* were located at points of desquamation and retrograde processes in the mucosa.

### 56 Hours

*Gross:* A definite caseated membrane formation appeared at this stage, one patch being about  $1\frac{1}{2} \times 2$  inches. The wall was swollen as the result of edema and infiltration.

*Microscopic:* Edema was prominent, especially in the sub-mucosa. Diffuse leucocytosis to a marked degree was present. Some parts of the mucosa were covered by an exudate composed of leucocytes, epithelium and other elements that had undergone coagulation necrosis (fig. 6). Erosion and karyorrhesis were also becoming prominent.

*Mucin:* This element was present in about the same quantity as in the previous case (32 hours).

*Fibrin:* This was present in foci of erosions and in the exudate enmeshing cells.

*Bacteria:* Mixed flora, suipestifer and necrophorus-like rods were found in the exudate. Invasion by these forms was observed in places where the mucosa was eroded. No aerobic-anaerobic alignment was demonstrated, anaerobic conditions not having prevailed long enough.

### 64 Hours

*Gross:* The wall was swollen as a result of edema and cellular infiltration which were more advanced than in the previous case (56 hours). Caseation also was more advanced and diffuse. The exudate on the surface was roughened, presenting the appearance of villi on a cow's tongue, and when removed left a depression.

*Microscopic:* The mucosal erosion was very marked. Congestion and edema were advanced with diffuse and marked leucocytic infiltration. A membrane composed chiefly of cellular exudate was present on the mucosa, which was completely caseated in some places while in others it appeared in various stages of retrogression.

*Mucin:* Similar to 56-hour subject.

*Fibrin:* This element appeared in the exudate enmeshing cells and was arranged in long continuous strands over part of the mucosa. Fibrin plays an important role in the formation of these membranes.

*Bacteria:* In places where the exudate was heavy the outer part contained a mixed intestinal flora. At the epithelial layer or beneath, in the mucosal tissue, suipestifer-like organisms were found. In the deeper parts of the exudate and upper mucosa

some necrophorus-like organisms were present. At points of sloughing the primary and secondary organisms again seem more contaminated with the mixed intestinal flora.

#### 80 Hours

*Gross:* The wall was markedly thickened with extensive caseation necrosis in the form of a rough membrane on the surface which could be rubbed off readily. In some places it had sloughed, leaving a raw granular surface.

*Microscopic:* Edema was pronounced and diffuse. Leucocytic infiltration of the wall had advanced further than in the 64-hour subject. Desquamation and cellular exudation were advanced. The caseated membrane was composed of an exudate on the surface as well as an extension of necrosis downward into the mucosa, this process being in its early stage in this subject.

*Mucin:* Mucin was demonstrable in considerable quantity in the exudate, as well as in goblet-cells and crypts.

*Fibrin:* This element constituted a large part of the membrane.

*Bacteria:* A mixed bacterial flora appeared in the upper part of the membrane. At the zone of mucosal erosions and beneath, numerous single organisms and clumps of suipestifer-like organisms were found. In many crypts short chains of necrophorus-like organisms appeared. No definite aerobe-anaerobic alignment of organisms was noted. Apparently anaerobic conditions had not prevailed long enough for the firm establishment of the anaerobic organism.

#### 88 Hours

*Gross:* The wall was greatly thickened. The caseated membrane was not so heavy as in the previous subjects. Extensive, raw, granular areas with patches of sloughed membrane were found.

*Microscopic:* Edema and congestion were advanced. Leucocytic infiltration was very dense and diffuse, in reality being a purulent condition extending to the inner circular muscle. The process of necrosis and erosion extended deeply into the submucosa. It was at this stage that a large part of the caseated pseudo-membrane was composed of considerable necrotic mucosal tissue in addition to the exudate on the surface. The submucosa showed extensive diffuse and focal karyorrhexis.

*Mucin:* Considerable mucin was present in the membrane.



*Fibrin:* Not quite so much fibrin could be demonstrated as in previous subjects. This apparent decrease in quantity of fibrin may be due to its specific stainability having been destroyed by digestion or necrosis.

*Bacteria:* Under the heaviest part of the exudate suipestifer-like rods and short chains resembling necrophorus organisms were present. There was a more advanced bacterial invasion of the mucosa than in the previous subjects although anaerobic conditions had not prevailed long enough for the necrophorus organisms to form the dense coils and skeins which characterized those cases of long standing succumbing to this disease.

#### 96 Hours

Upon gross examination this case seemed less severe because of the smaller amount of caseated membrane on the surface. A large part of the membrane had sloughed.

*Microscopic:* Histologic study, however, revealed that the process of necrosis had advanced more deeply than in previous subjects possessing a heavier caseated membrane. The submucosa was the seat of advanced focal and diffuse karyorrhesis.

#### 104 Hours

*Gross:* The wall was very markedly swollen. The caseated membrane on the surface was heavier than in previous subjects. Although composed largely of a heavy exudate, necrotic mucosal tissue made up a considerable part of the pseudo-membrane. Sloughing also was extensive in some places, leaving a rough raw mucosa.

*Microscopic:* The necrotic membrane was very thick, extending considerably into the mucosa (fig. 7). Considerable karyorrhesis was also present in the mucosa. In some foci, under a heavy caseated membrane, an attempt on the part of the epithelium to regenerate was noted (fig. 8). The balance of the wall showed a more dense progressive process of leucocytosis described as purulent.

*Mucin:* This material was found in the exudate, although in greater quantity in the crypts and goblet-cells.

*Fibrin:* This element was present in great quantities in the necrotic membrane, especially in that portion composed of exudation over the mucosa.

*Bacteria:* At this stage was found the first evidence of the typical alignment of aerobe and anaerobe. Suipestifer-like

organisms were abundant throughout the upper part of the membrane, while single necrophorus-like organisms and medium-sized chains were present in the deeper parts of the necrotic membrane and zone of karyorrhesis.

#### 128 Hours

*Gross:* Swelling and edema were progressive and more advanced than in previous cases. The entire wall was marked by an inflammatory reaction. A fine fibrinous exudate covered the intestinal serosa. The mucosa was covered by a caseated membrane 2 mm. thick, quite firmly adherent.

*Microscopic:* The microscopic picture checked the progression of the lesions mentioned under the gross description. The upper part of the mucosa had undergone caseation. Under this alteration were found marked karyorrhesis and leucocytosis. The balance of the intestinal wall at this stage showed retrogression, cellular changes and advanced dense leucocytic invasion. Extensive, advanced karyorrhesis together with leucocytosis was found in the submucosa. The wall had undoubtedly lost its functional ability in this subject.

*Mucin:* Traces of this element were present in the upper part of the membrane, while only a small amount was found in the goblet-cells.

*Fibrin:* This was very abundant, oozing out in wave-like arches from eroded vessels into the surrounding tissue and exudate.

*Bacteria:* At this stage was found a very characteristic alignment of the aerobe and anaerobe. *Suipestifer*-like and mixed flora were present in the upper part of the membrane. Histologic study revealed in the deeper parts foci of nothing but necrophorus-like organisms.

#### 152 Hours

*Gross:* The wall was greatly swollen, congestion being visible from the serosa. A heavy, rough, irregular, caseated membrane was present on the mucosal surface. Large pieces of caseated membrane which had sloughed were found in the lumen. Where sloughing had taken place a raw, granular surface remained.

*Microscopic:* The presence of a very heavy caseated membrane was confirmed. The process of necrosis extended more deeply into the mucosa than in previous subjects, and made up a large part of the caseated membrane. A third or more of the

mucosa was involved by necrosis. Karyorrhesis and leucocytosis affected the balance of the wall. Leucocytic infiltration was extremely advanced. Nearly the entire submucosa presented advanced karyorrhesis, bordering on caseation in some areas. The entire picture was more advanced than in any of the previous subjects.

*Mucin:* A large amount was present in the lumen and membrane as well as in the goblet-cells.

*Fibrin:* Very little fibrin could be demonstrated in the exudate portion of the pseudomembrane by means of the specific stain. Considerable of this element, however, was found in and around the foci of eroded vessels. It was also present in large quantities in the areas of karyorrhesis in the submucosa.

*Bacteria:* A fairly typical picture of aerobe-anaerobic alignment prevailed where the caseated membrane remained undisturbed and intact.

#### 176 Hours

*Gross:* The wall was swollen as in previous subjects. At this stage extensive patches of a very heavy caseated membrane were present. Numerous pieces of sloughed caseated membrane were found in the lumen.

*Microscopic:* The processes of necrosis and retrogression were more advanced than in any of the previous subjects. Necrosis extended more deeply into the mucosa, about half of which had undergone complete caseation. The balance of the mucosa appeared in an advanced state of retrogression. The muscularis mucosa was completely obliterated. Leucocytosis played the same part in this picture as in previous subjects. The submucosa was the seat of diffuse, advanced karyorrhesis and leucocytosis. This was the most advanced case in the series with respect to destruction of intestinal tissue.

*Mucin:* Mucin was present in liberal quantities in the membrane and also in numerous goblet-cells.

*Fibrin:* The necrotic membrane contained considerable fibrin, some of which had lost its specific stainability.

*Bacteria:* A mixed flora was found on the surface and in the lumen. *Suipestiifer* and *necrophorus*-like organisms were often present together in the caseated membrane, and there seemed less alignment of the aerobe and anaerobe.

#### 288 Hours

*Gross:* Swelling was a prominent feature. The mucosal surface was apparently the seat of widespread sloughing. A

fine yellow film covered the surface, suggestive of a new membrane forming. The surface appeared roughened, raw and granular through this fine yellow film with myriads of small red foci.

*Microscopic:* The mucosa was shallow, as though about a third had sloughed. The upper half of the remainder showed marked cellular retrogression. Congestion was a prominent feature. Diffuse leucocytosis was present to a very advanced degree. Numerous low, flattened, epithelial cells were found emanating from the crypts, apparently attempting to cover the denuded surface.

*Fibrin:* The specific stain did not combine with any fibrin, which was apparently lost through necrosis and sloughing of the pseudomembrane.

*Bacteria:* No aerobe-anaerobe alignment prevailed, but in some foci both necrophorus and suipestifer-like organisms were present at the edges of necrosis.

Throughout the series the intestinal tissues were actively reacting against the destructive action of the infection. This began with a gradually increasing inflammatory process and exudation. Beginning with the 80th hour, a gradual progressive involvement of the mucosa by the process of necrosis took place. In this series caseation necrosis involved more than the upper half of the mucosa in the advanced cases. The balance of the wall was usually affected by karyorrhexis and leucocytosis or had undergone advanced retrogression as was evidenced by the loss of clean-cut, differential stainability of the cells. Three subnormal pigs were fed cultures of *S. suipestifer* at the same time with the above-described normal subjects. These specimens were not affected with necrotic enteritis at the time of feeding the culture. The feces were devoid of blood, and diarrhea was absent. Two of these subjects died 152 and 160 hours after feeding, while the third, in a weakened condition, was destroyed at 172 hours. These cases were not included in foregoing descriptions. Upon autopsy examination, the subnormal subjects were found to be stunted, apparently as a result of ascaris invasion, the liver and gall-bladder being affected by the parasitosis and secondary bacterial invasion. The feeding of suipestifer cultures to these subjects, previously weakened by another factor or factors, produced lesions which were very much more advanced than those in the healthy subjects at the same length of time after feeding such cultures. In two of the stunted subjects the

membrane possessed all the qualities of a true diphtheric membrane as found in field cases of long standing.

#### LARGE COLON

The changes found during the first 16 hours were not outstanding. In the 16-hour subject a trace of slight capillary congestion and beginning cellular infiltration were noted. By the 32nd hour, the first definite changes appeared. The contents became adherent in some places, edema and serosal congestion barely becoming visible grossly. Desquamation was well established at this stage with traces of focal karyorrhexis. Material described as adherent contents was found glued to the mucosa by an exudate. No fibrin could be demonstrated by the specific stain. During this period the organisms had gained a definite foothold. *S. suispestifer* and a mixed flora were present in the adherent contents and exudate. *Actinomyces necrophorus* was noted in long coils and strands in the crypts and in this focal exudate. At 56 hours the exudate had increased markedly and had partly undergone necrosis, forming an early croupous membrane. General leucocytosis and early karyorrhexis and cloudy swelling were well established.

In the 80- and 88-hour subjects, a diffuse caseated membrane was present in the large colon. The exudate had undergone caseation and the mucosa itself was involved by caseation and karyorrhexis. Where the caseated membrane had sloughed, a raw granular surface appeared (fig. 1). Some karyorrhexis was present in the wall under the muscularis mucosa. Edema and congestion were prominent inflammatory reactions. Diphtheric membrane formation was under way at this stage, as was evidenced by the involvement of the intestinal wall by necrosis. Previous to this time the membranes in the large colon were of a croupous nature. Fibrin played a prominent part in the exudate and membrane formation. Mucin was present in the goblet-cells and crypts in considerable amounts, but only traces appeared in the exudate. Its possible alteration through dilution and the processes of necrosis and digestion suggests itself. This stage showed a quite characteristic alignment of the aerobe and anaerobe. The outer edge of the exudate was the seat of a mixed flora. Deeper in this zone were situated short chains and single necrophorus-like organisms and suispestifer-like rods. That part of the mucosa which had undergone necrosis was the seat of a marked invasion by necrophorus-like organisms.

The subsequent cases in this series need no detailed description. The processes of exudation and necrosis continued until a picture developed which was described as an advanced diphtheric membrane involving the upper half of the mucosa (fig. 2). The bacterial relations were in nearly all instances noted as "typical arrangement of aerobe and anaerobe" (suipestifer and necrophorus-like organisms respectively) or as described in one of the later cases, "typical arrangement, large fields of suipestifer-like rods in the upper half of the membrane with necrophorus-like organisms at the base." The large colon showed a more advanced involvement than the cecum.

The herd from which the normal subjects of this project were obtained had a negative history with reference to disease. Their feces nearly all contained *Balantidium coli* at the time they were selected for this investigation. However, the feces were devoid of blood, either gross or occult. In the study of the microscopic pathology of these experimental necrotic enteritis cases, the protozoan forms were found in the intestinal lumen and in the exudate, while in some instances they were present immediately under low flattened epithelium in areas of retrograde processes involving the upper part of the mucosa. Many of these pictures suggested previous necrosis with subsequent regeneration of the surface epithelium which had proliferated over the protozoan forms located at the edge of the necrotic areas. In no instance, however, was *Balantidium coli* found invading beyond the locations described. Such pictures were found chiefly in the subjects where sloughing had occurred followed by attempted epithelial regeneration in some foci, in spite of the fact that the destructive process was operating deeper in the mucosa. This condition was noted especially in the 96-hour subject. Upon gross examination some preceding cases seemed more advanced than later cases but upon microscopic examination it was found that sloughing had taken place giving a false impression, while in reality karyorrhesis was more widespread in the deeper structures of the later subjects. The amount of necrotic membrane appearing on the surface in the earlier subjects is not always a true guide as to the degree of deep mucosal involvement by necrobiosis.

#### SMALL COLON

In this experimental series, the small colon did not at any time show lesions of diphtheric membrane formation. The alterations



consisted of varying degrees of catarrhal inflammation and interstitial cellular infiltration and at times shallow erosions.

#### DISCUSSION

The purpose of this phase of the project was to study the lesions from their inception after the primary agent was introduced and to observe the various steps, if possible, as well as to correlate the presence of the primary and secondary agents in these various developments if any relation prevailed. This information would permit a more certain interpretation of the final lesions associated with enteritis and constitute a further check as the work progresses. Since the lesions in the ileum, cecum and large colon are the basic, ever-present, specific changes which characterize this disease, it is not necessary to enter into a discussion of the other organs, since these were covered in detail in the first studies and their character and development would not aid in a better understanding of the process and end results from the interaction between the bacterial agents and the body elements.

It is generally conceded that the proof of the etiology of a disease consists of the isolation of the causative organism, its cultivation and identification on artificial media, production of the same disease by the introduction of cultures of such organism in normal subjects, followed by subsequent isolation and identification. These requirements have been met. We have used doses of the primary agent that seem large. However, in so doing we have produced 100 per cent takes, i. e., a large number of subjects have succumbed, while others, destroyed after a reasonable period of incubation, showed advanced lesions. These premises would not prevail in a natural outbreak. It would not be practical to expose lightly a large number of pigs with only several well-developed experimental cases resulting when needed. Our aim in this part of the project was to obtain severe reactions so that the process would continue to advance to a fatal termination and thus enable us to make fair comparative observations in a reasonable number of cases from the beginning of the process leading up to the termination of the reaction between tissues and organisms.

Swine apparently possess considerable resistance against some types of pathogenic forms, e. g., trichina, *Balantidium coli* and some members of the *Salmonella* group. This raises an unlimited number of pertinent questions. Is necrotic enteritis a relative infection, i. e., can the organism be present and not produce

disease? If so, what are the factors which pave the way for disease production by the two organisms discussed? We know that virulence plays a large part in producing this disease experimentally. A culture which will produce only slight transitory disturbance in a given dose, after being kept on artificial media for a long period, can be enhanced in virulence by animal passages so that it will kill a large number of cases fed. Is this the maximum virulence developed under field conditions? This hardly covers the entire proposition, although it should be borne in mind that other pathogenic agents recognized as specific, causative factors sometimes fail to show their pathogenicity consistently after growth *in vitro*. It is not possible to produce this disease at will through field or animal exposure. Field histories and observations suggest possibly a high relative immunity on the part of swine, the requirement of a heavy consistent exposure, the proper virulence of the etiological agent, a factor of lowered resistance or some other agent paving the way in the development of the disease under field conditions. Further studies will be directed to some of these questions insofar as experimental work can be applied to them.

When the causative organism of a disease is proved it does not mean that the problem is solved. This thought prompts several warnings. From the standpoint of the practitioner, methods of control are the most vital. Experience with other diseases indicates that great caution should be exercised before any form of treatment is officially sanctioned. While the use of copper sulphate, buttermilk, lye-soaked oats, and other forms of medication are permissible and may be of some value, it must be recognized that judgment of them is based upon uncontrolled observations with many unknown factors intervening. The use of biological products in this disease is analogous to that in human typhoid and paratyphoid. Some important lessons can be learned from that problem. Vaccination in that field is universally considered successful under normal conditions. Numerous authors, however, show that vaccination is not always successful there when the sanitary barriers are dropped. Extensive discussion centers around that problem. When we refer to the elimination of the sanitary barrier in the human family we have a condition which is yet far removed from the conditions under which swine live; in fact, judged by human standards there is no sanitary barrier in swine husbandry. Swine are eaters of feces by virtue of their habits and environment under domestication. It is not alone the

modern methods of medical care and vaccination that have helped our typhoid control problem, but sanitation together with these methods which came into vogue at that time. Sanitary measures without other efforts actually stamped out human typhus. When one fails the other may not withstand the burden placed upon it.

These statements are made not with the intention of discouraging the ultimate development and application of biological methods of control, but out of all fairness to these agents to point out their limitations before their widespread adoption in the field under a feeling of false security. This thought is very well expressed by Soper<sup>2</sup> in the following quotation:

It is to the unreasoning confidence which has been placed in typhoid vaccination, often to the entire exclusion of other precautions that many of the seeming failures are attributed. But its strongest and wisest advocates do not pretend that it is a substitute for every other means of avoiding typhoid.

Army experience emphasized the value of vaccination against typhoid, but affords a warning that this is not the only measure which should be taken to avoid typhoid and paratyphoid fevers. When properly employed and used in connection with other measures of prevention, vaccination was shown capable of affording a very large measure of protection.

#### CONCLUSIONS

1. This experimental series follows and describes the process of diphtheric membrane formation from its inception after the introduction of the primary causative factor (*Salmonella suispestifer*).

2. The first step in this process consisted of the accumulation of an inflammatory exudate upon the surface of the mucosa. This process was followed by necrobiosis involving both the exudate and mucosal tissue. The mucosal necrosis was progressive and advanced towards the submucosa.

3. Mucin and fibrin played a definite part in the formation of the croupous and diphtheric membranes.

4. Definite croupous membrane formation as found in the early stages of acute field cases was noted 56 hours after feeding broth culture of *S. suispestifer*. Sixty-four hours after experimental feeding, caseated membrane formation of a diffuse and more advanced character was found.

5. Observation of the developments leading up to the final intestinal lesions with reference to the alignment of the primary

and secondary etiological factors confirms and checks our original interpretations of such lesions and the relations of the organisms involved.

6. The deep invasion and establishment of the secondary factor (*Actinomyces necrophorus*) is directly related to the formation and presence of a caseated membrane which creates an anaerobic environment.

7. Acute inflammatory lesions with necrosis and other retrograde processes developed in the stomach and small intestine but the process had not advanced to a permanent caseated membrane formation up to the twelfth day. In this organ the intensity of the reaction seemed to have subsided somewhat in the last two subjects of the series.

8. All parts of the gastro-intestinal tract were exposed to the cultures fed in probably less than twenty-four hours based upon our results with test feeds.

9. *S. suispestifer* was present in the mesenteric lymph-nodes of the small intestine prior to thirty-two hours after feeding.

10. The action of *S. suispestifer* was greatly intensified when introduced in subnormal subjects affected with ascariasis, but free from necrotic enteritis manifestations at the time of feeding. The lesions developed more rapidly and were of a more much advanced character as compared with the normal subjects of the same duration after being fed a culture of the primary causative organism.

#### REFERENCES

- <sup>1</sup>Murray, Chas., Biester, H. E., Purwin, P., & McNutt, S. H.: Studies in infectious enteritis of swine. (First paper.) Jour. A. V. M. A., lxxii (1927), n. s. 25 (1), pp. 34-89.  
<sup>2</sup>Soper, George A.: Protective value of typhoid vaccination as shown by the experience of the American troops in the war. Amer. Jour. Pub. Health, x (1920), p. 301.

#### DISCUSSION

DR. WARD GILTNER: Is there immunity to the disease that you produce? Is this a perfect picture of the disease that you find in the field in Iowa? And what are some of the relationships of this suispestifer disease to cholera disease?

DR. BIESTER: I will answer your last question first. We have attempted to avoid all complicating factors such as hog cholera or other diseases so that in all these studies we have eliminated hog cholera. In other words, we wanted to study this disease in its pure form and make a starting point for the further study of different intestinal diseases. There are several other diseases which might be closely allied pathologically, the so-called bloody diarrhea, and another diarrheal condition which clinically has been confused with this disease, and yet does not show a membrane such as is found here.

As to the immunity, I should emphasize the statement which I made before. This is a specific disease, just as specific as human typhoid fever, and we have a problem that in every way compares with it. An attack of the disease seems to be followed by an immunity. Some immunity is developed by the use of biologics, as is shown by the agglutination test. Whether or not it is sufficient to protect pigs under field conditions is difficult to determine, but I would like to state that we have made a number of suggestions in handling this disease and other people have likewise; feeding oats soaked in lye, copper sulphate,

buttermilk, etc., All those agents have been assigned as giving good results, but I believe we have a proposition here that is just like human typhoid fever. We should proceed rather cautiously in recommending any one method. We generally assume that the human typhoid vaccine acts quite successfully, but you will find all through the literature that every day someone is defending that method. The sum and substance is that there is no one agent which will control that disease as soon as the sanitary barriers are broken down, and I believe we will not accomplish anything with biologics or nursing until better sanitary measures can be worked out.

Field and experimental subjects present the same type of lesions. Microscopic differences can be recognized in some, depending upon the duration of the process. Some acute field cases will often resemble experimental cases and vice versa.

DR. GILTNER: Is this disease contagious, and have you attempted exposure work on it?

DR. BIESTER: It is an infectious disease. After these pigs had been fed a culture of virulent *Salmonella suipestifer* they developed the disease. As to being contagious, it seems to be one of those diseases which when one wants to produce it experimentally by contact it cannot always be done. There seems to be a slight resistance or some aiding, disease-producing factor. A small amount of a typhoid culture fed to a human being would produce disease, but in swine the condition produced by the *Salmonella suipestifer* seems to be more or less of a relative disease.

DR. J. W. CONNAWAY: These pictures which Dr. Biester has shown can be used to show filtrable virus lesions. That is, if you will take perfectly healthy pigs and inoculate them with filtrable virus and let these pigs die, you can develop all those lesions; so it would seem to indicate that here we have a sort of universal infection in all hog-lots, and the weakened condition of the animal is one of the very favorable conditions for the development of these—what we used to call hog cholera—lesions. We have done that in various experiments, and we know that those lesions contain those organisms as Dr. Biester has shown, and this recalls, too, the work which was done back in ancient days by the Bureau and by Dr. Peters while he was in Nebraska, against the old suipestifer disease, which in those days failed. So I think that the suggestion that this is a disease to be controlled by sanitation is following along the right lines, and it is hardly practical to try and combat this disease by specific bacterins or serums and that if we control hog cholera, the filtrable virus disease will be comparable to this, and when you take the pure culture, and probably a very virulent culture, that you will produce disease. Now, at our meeting for graduate veterinarians, at Columbia, last winter, Dr. Kinsley furnished us some cultures to try out and make a demonstration of the virulence of the germs. We selected what we thought were appropriate pigs and inoculated them and to our disappointment none of these pigs came down, and the demonstration failed.

DR. BIESTER: We have fed various paratyphoid and so-called *suipestifer* cultures and we were unable to produce results with those, but the point is that all our studies were based upon herds where there was no evidence of hog cholera. We avoided that in every way, so that this is a proposition of *Salmonella suipestifer* infection which is not always associated with cholera. It can be absolutely independent of hog cholera. Debilitating factors will play some part, as is evidenced by one of these groups of culture fed pigs in which we included three runt pigs. We assumed that they had parasites, and when they were destroyed with other given pigs at the same time after culture feeding, we found that in the pigs which had the heavy infestation of worms in the liver and gall-bladder, the lesions of necrotic enteritis were much more intensive than in the normal pigs, although none gave evidence of intestinal lesions before, that is, their feces were free of blood.

INDEX TO FIGURES

- FIG. 1. Large colon, 80 hours after feeding culture of *Salmonella suispestifer*, showing a relatively heavy caseated pseudo-membrane which has sloughed in some places, leaving a raw granular surface. Actual size.
- FIG. 2. Anterior large colon, 128 hours after culture feeding, presenting a heavy caseated pseudomembrane quite firmly adherent. Actual size.
- FIG. 3. Small mesenteric lymph-node, 32 hours after culture feeding, showing congestion and edema. x 450.
- FIG. 4. Small mesenteric lymph-node, 88 hours after culture feeding, showing a small focus of necrosis adjacent to lymphoid tissue infiltrated by leucocytes. These two processes produce the mottling described grossly. x 450.
- FIG. 5. Cecum, 32 hours after culture feeding, showing desquamation and leucocytic infiltration of the upper portion of mucosa. x 125.
- FIG. 6. Cecum, 56 hours after culture feeding, showing inflammatory reaction in mucosa and heavy exudate on surface, being the first step in the pseudomembrane formation. x 125.
- FIG. 7. Cecum, 104 hours after culture feeding, showing deep involvement of mucosa with heavy pseudomembrane formation almost completely caseated and quite firmly adherent. x 125.
- FIG. 8. Cecum, 104 hours after culture feeding, showing mucosa less deeply involved than in fig. 7, but a very heavy caseated membrane formation. Some attempts on the part of epithelium to regenerate. Two *Balantidium coli* at base of pseudomembrane. x 125.





FIG. 1



FIG. 2



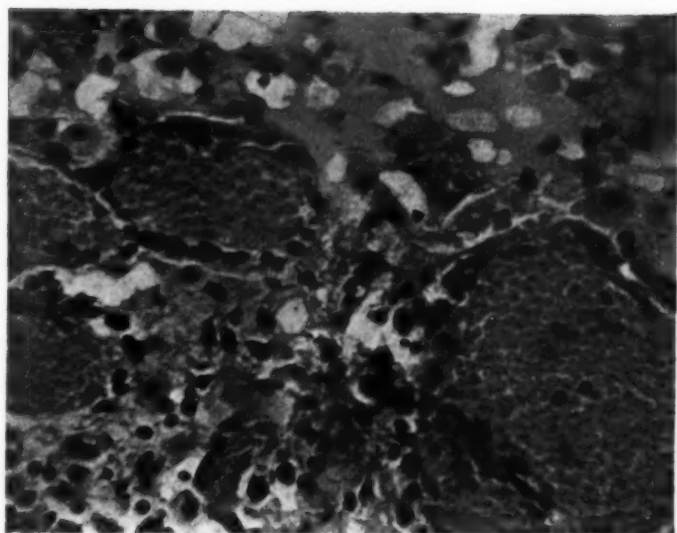


FIG. 3

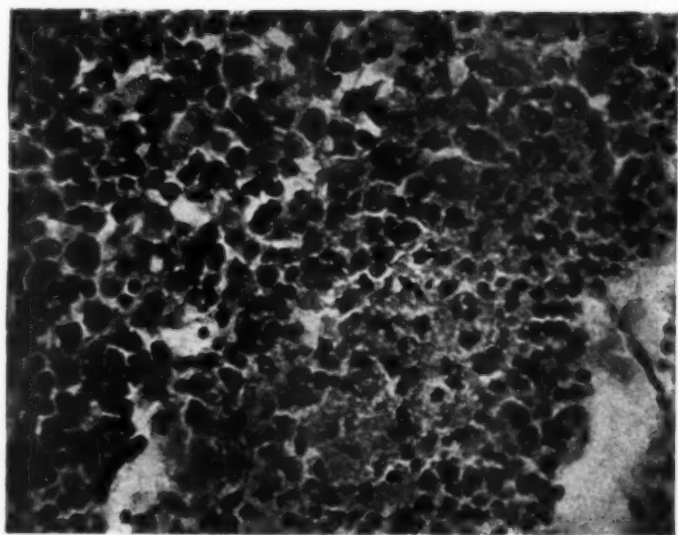


FIG. 4





FIG. 5

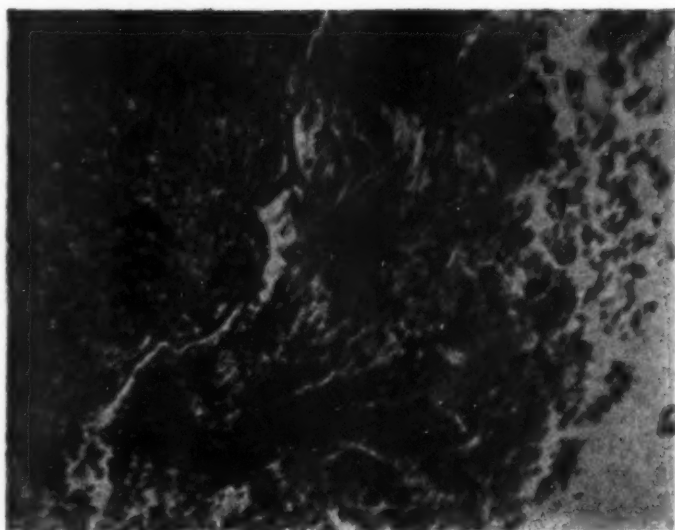


FIG. 6





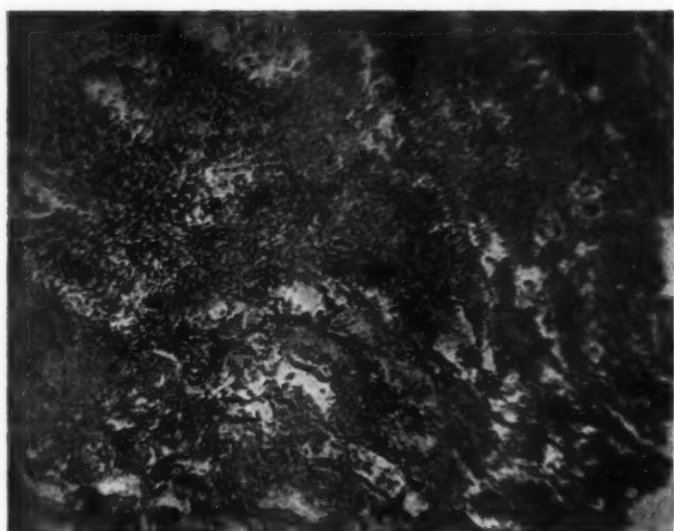


FIG. 7



FIG. 8



## THE CONTROL OF RABIES BY PROPHYLACTIC VACCINATION\*

*By A. EICHHORN, Pearl River, N. Y.*

Ever since the infectious nature of rabies was recognized, attempts to control it have been inaugurated. Until more recently, such control measures were directed principally towards the prevention of the spread of the disease by guarding susceptible animals against exposure and by preventing exposed and infected animals from infecting susceptible individuals. Therefore, the effort was directed towards quarantine measures, muzzling and the elimination of stray dogs.

While in some localities, yes, even in some countries, such measures have accomplished either partly or entirely the results expected, in other countries they have entirely failed, primarily due to the difficulty of effectively enforcing the measures.

In the United States, the general opinion prevails that sanitary measures have failed to control the disease. As a matter of fact, we have to recognize the fact that from year to year the continuous increase of the spread of the disease has been observed until it now is a great menace.

In recognition of the continuous increase in the number of cases from year to year, a more effective method of prevention was welcomed when the Japanese investigators, Umeno and Doy, announced the successful prophylactic vaccination of dogs by a single-injection method.

Previous to this announcement, various investigators were engaged in the study of immunization of dogs and from time to time announcements were made of a more or less effective prophylactic vaccination of animals. In all instances, the fundamental principle underlying the methods has always been the virus obtained from the central nervous system. Of these various methods, we wish to mention that of Högyes, first time employed on animals by Kurtz and Aujesky, in 1900; also the methods of Plantureux, Schnurer, Miessner, Fermi, Marie and Remlinger, Finzi, and Puntoni.

These various methods, although employed only experimentally or to a limited extent in practice, have given very promising results. It has been recognized, however, that for practical

\*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

application a method must be employed which would effectively immunize an animal with the least number of injections.

The phenol vaccine of Umeno and Doy appeared to meet such requirements. Accurately controlled vaccinations, as conducted by this method in Japan, have demonstrated the great possibilities of controlling the disease. The experiments of Umeno and Doy were soon confirmed by other investigators, including Eichhorn and Lyon, Reichel, and Schlingman, in this country, by Schnurer in Austria and more recently by Professor Kurt Schern, of Montevideo, Uruguay, and by Miessner, of Germany.

In the United States, the prophylactic vaccination by the single method with a phenol vaccine was first employed in 1921. Its use has been continuously in vogue since that time. While no accurate data are available, it may be stated safely that in the past six years at least two million dogs have been vaccinated by this procedure. Unfortunately, no statistical data are available in the United States on the results of the vaccination. However, in localities where compulsory vaccination has been adopted, accurate data on the vaccinated dogs are obtainable and they appear to show conclusively the value of the vaccination. On the other hand, the vaccination officially controlled in Japan, which now numbers over 500,000 dogs, also has shown that vaccination offers splendid possibilities for the control of rabies in dogs.

On the other hand, the opinion of the value of the prophylactic vaccination for the control and eradication of rabies is not, as yet, recognized by all authorities in charge of the control work. However, it appears that investigations are now on the way or are now being planned, which we hope will conclusively establish whether the prophylactic vaccination of dogs, as practiced at the present time, would be the most promising means of controlling the disease.

The acute interest in rabies control throughout the world is best illustrated by the fact that an international conference was held in Paris, April 25 to 30, 1927, in order to study the questions which effect the prevention of the disease. The conference was held under the auspices of the Hygiene Section of the League of Nations, with twenty-nine different countries being represented. In preparing for this conference, the Committee on Hygiene sent out questionnaires to all the rabies institutes of the world and the compiled data, following the organization of the conference, were

assigned to four sections for consideration and for recommendations as to conclusions.

We cannot, at this time, take up the conclusions of all these sections, but it might be of an advantage to discuss all those phases of rabies dealt with at the conference which, we feel, would be of particular interest to veterinarians and especially to give in detail the conclusions reached on the vaccination of animals.

Section 1 of the conference adopted the conclusion that rabies virus should be considered as a filtrable virus; the difficulties encountered at times in the filtration being due to the clogging of the filters by the fatty substance of the emulsified nerve tissue and on the porosity of the filters.

The section could not express an opinion of the protozoan or bacterial nature of rabies virus from the microscopical preparations exhibited by Levaditi and Manouelian. They did not believe they were in a position to decide whether the Negri bodies represent a phase in the development of the living micro-organism or whether they are the result of a reaction or the breaking down of the nerve cells.

Sections 2 and 3, which dealt with the methods of immunization and sequels following vaccination, have expressed themselves on the effectiveness of the Pasteur immunization method.

The harmless effects of the subcutaneous injection of the living fixed virus have also been recognized and, finally, it has been accepted in the conclusions that the killed or attenuated vaccines provide a sufficient immunity. This statement appears of particular interest, since in the United States, in the last few years, the phenolized vaccine administered to human beings after exposure has gained in favor to such an extent that this method, known as the Semple method, has almost entirely supplanted the Pasteur and all other methods. It is generally recognized that the phenolized vaccine used in the treatment of human beings is giving very reliable results, and inasmuch as the preparation is practically identical with the method used in the production of the prophylactic treatment for dogs, we must accept that the method employed in dogs should be likewise effective.

The cause of post-vaccination paralysis, at times observed in human beings and also in dogs following vaccination, has not been cleared up by the conference. It has been recognized that conditions such as alcoholism, syphilis, nervous conditions, fatigue and overexertion are predisposing factors for its development. It

also has been established that such cases of paralysis more frequently develop at the ages from 20 to 60 and in men engaged in intellectual pursuits. The cases of paralysis are less frequent following the use of vaccines prepared from spinal cords treated with glycerin and from phenol vaccine.

The important phase which bears on the infectivity of the virus was also considered in the discussions, with regard to the advisability of the treatment of man in cases when the skin comes in contact with the saliva of a rabid animal. The opinion prevailed that in the absence of abrasions on the skin, there is no need of subjecting the person to treatment. However, the great majority was of the opinion that in case the mucous membrane becomes exposed to the virus of rabies, it is advisable in all cases to administer the treatment. The conference urgently recommended experimental work to establish whether there exists a plurality in the strains of the street and fixed virus and likewise to conduct such work on the rabicidal action of the serum of man and animals during the immunization and following the same.

It was further recommended that a thorough study should be undertaken of those strains of virus which have been isolated from cases in which the treatment failed in spite of apparently slight injuries. The accumulation of detailed statistical data on the results of the treatment, on the type of exposure, the extent of the injury, etc., was also emphasized.

Section 4, which dealt principally with the vaccination of animals, recommended the following conclusions, which were accepted by the conference.

1. That the prophylactic vaccination against rabies should be carried out. The vaccination should be conducted with the killed but immunizing virus or with a fixed virus, either attenuated or unattenuated. Such virus should be harmless to dogs upon subcutaneous or intramuscular administration.

2. That the vaccination should be repeated annually.

3. That for the time being, at least, the vaccination should be conducted by rabies inoculation institutions, in veterinary colleges or by responsible official veterinarians.

4. That the vaccinated dogs should be subjected to an observation for four months and that, at the end of the fourth month, they should be examined by an official veterinarian.

5. That all this administrative control should cease as soon as a sufficient number of animals have been vaccinated. (We feel that with the large number of vaccinations of dogs carried out in the United States, the requirements of paragraph 4 can now be eliminated, as suggested by the conference under paragraph 5. Eichhorn.)

6. That for the employment of the vaccination on suspected exposed dogs, the present law should be modified and that they be distinguished from dogs known to have been bitten by rabid animals. Dogs which are



known to have been bitten by a rabid animal should be killed without regard to whether they were vaccinated or not. On the other hand, dogs which are only suspected of having been bitten may be vaccinated under condition that they be subjected to a six-months quarantine.

7. That cats should not be immunized either before or after exposure. Regarding other domestic animals than dogs, it is advisable:

8. That the prophylactic vaccination should be carried out only in such localities in which rabies is widely spread.

9. That the immunization be carried out with the killed but immunizing virus or with the fixed virus attenuated or unattenuated form.

10. That vaccination should be recommended even after a bite by a rabid animal with the same vaccine as prescribed in the preceding paragraph.

11. That the vaccine be administered in the first four days following the exposure and, at the latest, before the tenth day.

12. That animals bitten by a rabid animal should not be slaughtered for food, from the eighth day following the bite until the end of the third month, without regard to whether they have been immunized or not.

No doubt, the conclusions reached by the conference have been adopted after very careful consideration and one cannot help but recognize that the conference has adopted a very cautious attitude in its recommendations.

The destruction of the vaccinated animals bitten by a rabid animal would tend to discredit the value of the vaccination and it appears that the conference is considering the recommendation as a preliminary step until more data can be accumulated to establish definitely the possibility of controlling and eradicating rabies by the preventive vaccination of dogs against rabies. With the present conclusions reached by the conference, the vaccination would tend only to diminish the number of cases of rabies in animals and man and to offer to the owners the safety that a dog which has been unknowingly bitten by a rabid animal is protected.

Schnurer, who attended this conference as a delegate from Austria, is of the opinion that the sentiment of the conference was that the prophylactic vaccination of dogs has passed the laboratory stage and, therefore, that the vaccination is ripe for its practical application.

With the experience gained in Japan and in the United States, it appears that the prophylactic vaccination of dogs should be uniformly approved and recommended. This procedure is more justified in this country than in most of the European countries, in view of the fact that all regulatory measures adopted for the control of rabies have not been effective in checking the spread of the infection. The enforcement of strict muzzling and quarantine is not being carried out and in view of the splendid possi-

bilities which the prophylactic vaccination offers, the procedure should be recognized as the best means of control.

While the prophylactic vaccination of dogs in the United States has made considerable strides and from all indications the procedure has been accepted with favor by veterinarians who have had good opportunities to follow up the results, nevertheless, it appears essential that in the interest of the veterinarians as well as for public health reasons, a uniform procedure should be adopted, particularly so with regard to the production of the vaccine and its administration.

The fixed virus employed in the preparation of the vaccine should be of a known immunizing strain and should be distributed to the producing laboratories by the Bureau of Animal Industry. Likewise, in the manufacture of the vaccine, a uniform procedure should be followed, particularly with regard to the amount of brain material to be contained in each dose. This would necessitate a uniform maceration of the brain tissue and a filtering of the same through such material which would tend to pass a more or less definite quantity of the macerated material. The dose should contain not less than one gram of the brain tissue for each dog to be vaccinated. These recommendations are made in view of the fact that practically all experiments conducted were with the above-stated dosage and very little information is available on the effects of smaller dosage.

The administration of the vaccine should be conducted under the best aseptic precautions, as any complications resulting from carelessness would tend not only to react on the product or the technic of the administrator but also tend to retard the progress of controlling the disease by vaccination.

#### CONCLUSIONS

1. The effectiveness of the prophylactic vaccination of dogs has been proved not only upon laboratory experiments but also in practice.
2. Phenolized vaccine prepared from an immunizing fixed virus has proved most effective.
3. A standard method of production of such a vaccine should be adopted.
4. Sanitary control measures should continue to prevail in localities where rabies is prevalent and supplement the vaccination.

5. The public should be educated to the advantages of vaccination. Compulsory vaccination should not be forced upon the people at this time, as an organized opposition might prove harmful to the control of the disease either by vaccination or by other measures.

#### DISCUSSION

DR. F. G. STEINBACH: Is the phenolized vaccine absolutely sterile?

DR. EICHORN: Well, it is practically sterile. The phenolization employed in the manufacture of the product is sufficient to destroy practically all of the pathogenic organisms.

DR. STEINBACH: Why is the vaccination of cats before exposure discouraged?

DR. EICHORN: I do not believe that it has been discouraged, until this conference. I do not know of anybody in this country who ever discouraged the vaccination of cats, and it is my opinion that the reason the Conference adopted the procedure is because cats are so apt to become much more vicious than dogs, and inflict more serious injuries and therefore they do not want to take any chances with cats.

DR. STEINBACH: Is there some possibility of transmitting rabies through phenolized virus?

DR. EICHORN: No. A slight doubt exists and it was reflected in the conclusions of the Conference, which rather tend to cast doubt on the absolute effectiveness of the vaccination. However, not on account of the danger of giving the disease by the vaccination, but more so because they considered that the value of the vaccination has not been absolutely proven. We have to consider that the conclusions reached by the International Conference are looked on everywhere in the civilized world as scientifically and practically proven, therefore, this being the first international conference on rabies, it is natural that they would be somewhat cautious in making specific recommendations. But in the address made at this conference, particularly with regard to prophylactic vaccination of animals, the recommendations were uniform in advocating it.

DR. M. J. HARKINS: Referring to Dr. Steinbach's question, I doubt if even the subcutaneous injection of untreated fixed virus emulsion would produce rabies in a dog. I say that because in the old Pasteur method of treatment, a one-day cord very rarely, if ever, will produce rabies on subcutaneous injections, unless given near a large nerve-trunk. The herpes simplex virus, the virus of lethargic encephalitis and rabies virus have in common one marked characteristic, that is, their affinity for nerve tissue. There are other features of these three types of viruses which are identical though their infectiousness for animals varies. The herpes simplex virus is readily transmitted, the fluid from common, ordinary fever blister producing an encephalitis in rabbits many times in nine or ten days. Encephalitis virus is more difficult to transmit to animals; in fact, it is the principal difficulty of the study of that disease. However, an occasional monkey is infected.

From an immunizing standpoint, rabies virus more or less stands out alone, I am referring more to those viruses producing nerve rather than skin lesions, as an immunizing agent—it appears you can do almost anything with it up to the point of mistreating it and still have some immunity produced. With the herpes and encephalitis virus it is the opposite. Some of the eastern workers have reported obtaining immunization with herpes virus, but herpes viruses vary greatly, more so than rabies viruses. In my work, herpes viruses produced very little immunity. Dr. Eichhorn is to be congratulated on his paper, which suggests many leads for further research, which, personally, I would like to see our veterinary institutions study. Rightfully it belongs there and not in institutions for human disease research.

DR. H. W. SCHOENING: I would like to ask Dr. Eichhorn whether he has had any experience with these cases of vaccination paralysis. I think that is quite an important feature in the vaccination of dogs, and while I believe it

happens infrequently, it does happen. We recently had our attention called to the following case. There were twenty-five dogs vaccinated at a certain army post, and three of these dogs developed a paralysis following vaccination. The first dog showed symptoms of incoordination five days after vaccination, and about the seventh day the dog was completely paralyzed. Two other dogs showed incoordination, and one of these showed chorea-like symptoms, and would give convulsive jerks every two or three minutes. These dogs were kept under observation and it was thought at first they were coming down with rabies. In fact, the first dog was sent to a veterinarian's private hospital, and the veterinarian made a tentative diagnosis of rabies. I saw the dog two or three days later, and it was completely paralyzed, except that it could eat and drink. There was no evidence of throat paralysis. The dog stayed in that condition five or six days and finally began to improve, and complete recovery took place in about two or three weeks.

The other two dogs never got to the advanced stage of paralysis, but this incoordination disappeared after about two weeks and the dogs were sent home. Various explanations are given for the cases of paralysis following vaccination. One of them is that it is a protein reaction; another, that there might be a fixed-virus infection; and the third explanation is that it might possibly be due to a rabies toxin. We were unable to test out this particular product, to see whether it was a live virus or not, but the fact that the incubation period was very short—in this dog five days following the subcutaneous inoculation—and the fact that the animals recovered, made us come to the conclusion that it was not a case of rabies infection, but paralysis from some other cause, possibly a rabies toxin.

It has been reported by Plantureux, of the Pasteur Institute in Algeria, that a presumably killed vaccine is capable of producing a paralysis, but those cases are not so frequent as where a live, attenuated vaccine is used. I think that is quite important. The original Umeno and Doi vaccine was capable of producing the disease itself, a fixed-virus infection. We had an instance of that in our experimental work. One dog was vaccinated with a single-dose vaccine, prepared according to the method of Umeno and Doi, which is an attenuated vaccine, and not a killed product. About three months after vaccination, the dog developed a paralysis and lived about two days. After the death of the animal, rabbits were inoculated, microscopical examination made, no Negri bodies were found, but the rabbits all developed the paralysis on the seventh day. Three additional rabbits were inoculated and these also developed a typical rabies paralysis on the seventh day. From this it was concluded that the dog died from a fixed-virus infection produced by the vaccine.

DR. EICHHORN: The cause of paralysis has been studied quite extensively, and, as Dr. Schoening stated, no definite information is obtainable to show what the cause of the paralysis is, but we know that cases so develop following the Pasteur treatment, just as frequently as following the Semple method. In dogs paralysis may develop in a single animal, whereas hundreds of dogs vaccinated from the same batch will show no ill effects. Fortunately, cases of paralysis are very rare. I do not believe that in 100,000 vaccinations, more than two or three cases of paralysis develop. Now, the instance cited by Dr. Schoening is extraordinary. And the fact that symptoms of paralysis were observed on the fifth day would, I think, eliminate the possibility of a rabies infection. I know of a case in which paralysis developed on the third day after the vaccination. We do not know of a single instance in which, upon subcutaneous injection, fixed virus can produce symptoms of rabies on the third day. It takes at least six days. I think there were some cases observed on the fifth day, but usually six days before symptoms develop even on intracranial or intracranial injection. Therefore, in such cases we can exclude an active infection. Whether a toxin or the foreign protein reaction might be the cause of such paralysis has not yet been definitely established. In my opinion, such cases will never communicate the disease to man or other animals.

DR. JOHN REICHEL: We are very much indebted to Dr. Eichhorn for the points of view he expressed here this morning, and particularly the report from Paris of the International Conference on Rabies. I am very much interested

in the paralysis and the period of 120 days as reported by the Conference. My own experience with rabies dates back a good many years, and I have followed the results of the Pasteur treatment on human beings rather closely. The treatment combines the use of both living and dead virus—and paralysis has set in in some cases. Now curiously as it may seem—and I have yet to see the exception to it—we have never noted it with the Semple treatment on phenol-killed vaccine. The amount of brain tissue in the Semple fourteen-dose treatment is greater than in the Pasteur treatment. Therefore, reasoning from that standpoint alone, we must say that the foreign protein material being there in greater amount in the Semple treatment ought to produce paralysis more frequently in human beings, but the reverse is true, as there is less material in the Pasteur treatment which is followed by paralysis more frequently. It would seem that treatment paralysis is intimately tied up with the virus, and whether it is a by-product of the virus, or an attenuated virus or living virus, I am not in a position to state, but I do think that whenever the paralysis comes up, the first thing to do is to rule out the question of living or attenuated virus.

Now, I am not at all surprised that treatment paralysis might set in in a dog, but I have not heard of it in my experience, as yet—treatment paralysis setting in, with a dog treated with actually killed virus.

It is noted with interest that the Conference asks that a dog be kept under observation for 120 days. I think that is of a great deal of value to the public, and I do think all of us who are interested in rabies immunization and rabies vaccine ought to recommend that unhesitatingly. We ought not to continue to state that a vaccinated dog is safe. The Conference says he ought to be kept under observation 120 days, and that is good common sense.

I am also interested in what the Conference had to say about the question of strains, recognizing that it is logical to expect there might be different strains of rabies virus, but I do not think there has been any evidence produced as yet to indicate that there is a multiplicity of strains, and that one strain will not protect against another. I do not think that there has been any real work done in that connection, and I do not think the question need be raised as far as the practicing veterinarian is concerned. I think he can rest assured that a vaccine produced with fixed rabies virus will give him all the protection that he can possibly expect.

As to the infectivity of the fixed virus, it has been the practice for years to disregard exposure to the fixed virus. Time and time again, in the administration of the Pasteur treatment, the administrator would possibly prick his finger with a one-day cord vaccine. From all we have been able to gather from the past, we have always complimented him that he has had an immunizing dose to a small extent, and need not worry about it. However, I do know that Kelsner actually infected a sheep by subcutaneous injection of fixed rabies virus, and it is the only case I know of, so I do think when those things are brought before us, we ought to say that fixed rabies virus may, under certain circumstances, produce rabies. On the other hand, the Conference again states that dead rabies vaccine will immunize as well as attenuated or live ones, and there is no need of using a living or attenuated virus.

DR. STEINBACH: One phase of the subject that is probably a little bit foreign to the vaccination against rabies was one with which I have been confronted during the last two months. About two months ago, a dog was brought to my office from Stone Harbor, with what appeared to be a typical case of rabies. It just happened to be that Dr. Goldhaft, of Vineland, was in my office at that time, and he agreed with me that it was rabies. The dog had paralysis of the lower jaw, saliva dripping down, and that typical careless gait, running around, paying no attention to anything that he gathered from the sense of smell, his head up in the air, that typical business-like rabies trot, and this dog had been bitten by another dog seven days before. It seems like an unusually short period of incubation, if this condition was rabies. It had probably shown symptoms of rabies before that time. It was just exactly seven days from the time it was bitten. Upon going into the history of that case, I found that the dog that bit this dog was still living; in fact, they told me that the dog seemed to be all right, and I advised them to have the owner of the dog, which bit this particular dog, bring the dog to me for observation. The dog



was brought the following day and appeared to be perfectly normal and happy. I asked about the history of the case. I asked whether the dog had been bitten and, if I remember right, he said the dog had been bitten about a year before. And I said, "If you notice any queer symptoms (I described some of the things that might happen in case this dog should develop rabies,) let me know." And he promised he would. They were very nervous; they thought a great deal of the dog, and were very much relieved when I told them I observed no evidence of rabies there. However, they were willing to part with the dog if necessary. So, of course, I did not destroy the dog, under the circumstances. And, by the way, I asked about the voice of that dog, if it showed any change in the voice at any time. They said, "Yes, he was hoarse, but had been so for a year." The fact that the dog had been bitten about a year previously just seemed to strike me funny. Then, on further investigation, which was just last week, I took upon myself the job to go over there, and I found out that that dog had bitten two other dogs. I was over there last Sunday, and the owners of the dogs—they were summer people and live in Philadelphia—had gone home. He had bitten two other dogs, both of which died, one dog exactly two weeks after being bitten, and the other they did not know when. Both of the owners were summer people, and I could not get in touch with them. However, I am trying to get in touch with the owner of that dog. I thought it would be an interesting thing to make some tests with that dog's saliva to find out whether it is possible for a dog to be a carrier of the disease and yet not manifest symptoms of the disease himself. I was talking with Dr. Eichhorn just a couple of minutes before he came in here, and told him of that condition and asked whether it had been discussed in Europe, and he said it had, but had never been proven.

**DR. EICHHORN:** The question of rabies carriers, as in so many other infectious diseases, has been given some consideration, but from all available data, there is nothing on record to show that the dog may be a true carrier of the rabies virus. When such has been suspected, is it not possible that the dog had been unknowingly bitten by another animal? There is always such a possibility in suspected cases of rabies. Veterinarians are frequently told that the dog has never been bitten, that it had never been allowed outside the house unattended; yet, a true case of rabies is established in the dog. I doubt very much, whether a dog could transmit rabies and not develop definite signs of the disease.

**DR. S. E. HERSHEY:** Just before I left home, I had a case of rabies. It had never been bitten; never been exposed—so they said—with the exception that it had been bitten by a dog seventeen days prior to the time it was brought to my hospital. This dog, when brought in, showed typical symptoms of rabies. The fourth day after it was brought to the hospital, this dog died, with typical symptoms of rabies. Of course, the owner could not think of such a case. We had our state laboratory make a microscopical examination of the brain and they reported back to us positive findings, but still the owner was not satisfied. But I got a portion of the brain and sent it to Dr. Buckley, of the B. A. I., just the day before I left, asking for another microscopic examination. Now, the dog which bit this one was still running at large on a street right across from where the hospital was, and so in that case that would be a carrier, as related here.

Now, this dog came from Roanoke, Virginia, possibly six months prior to this, and was said by the owner never to have been out, only on the leash, but in my own locality, in West Virginia, we have had a hot-bed for over three years, and I have seen between 350 and 400 cases myself. I think every dog in our locality has been exposed—either directly or indirectly—and while I have vaccinated a number of dogs with the single-dose anti-rabic vaccine, I am glad to say I have had no breaks so far, but I always advise to keep the dog under observation for at least sixty days, but I think ninety days is better, because I have had one case, one dog, that I know, that went for two and one-half years from the time it was exposed before it developed rabies. I will explain that in this way. We had a dog in one household for two and one-half years; and the old dog developed rabies; two and one-half years later, there was a puppy developed rabies. Now, there may have been some other exposure



that we did not know of, but we do know of that occurring in a single home, so it looks pretty much as though the incubation period there might have been a long time. In another case, six miles out from town, there was a case of rabies in a cow, that developed thirty-two months later. We had another cow to develop rabies that had been running in the same pasture field where the first cow was. Now it has just been in the last three months that I have been able to trace that down, when that dog was in that pasture field first, and I might say further that four years ago, I had two cases, two breaks, where I had used a single-dose anti-rabic treatment, one in a dog, and one in a cow, so I have thrown away the six-dose anti-rabic treatment in my own locality and where we have used the 14- or 18-dose treatment as a preventive, we have had no breaks.

DR. HAMLET MOORE: I am located in New Orleans. You gentlemen have probably read in the journals, in the last year, a report of rats as carriers of rabies. I have had two cases of rabies that I know are attributable to rat-bites. I had one in the month of June, this year, a Spitz dog that, like Dr. Eichhorn says, had never been bitten. Of course, I have had hundreds of these cases, where there have been no bites at all, but we have found, in 98 per cent of the cases, they have been bitten. But this one, I am satisfied, had never been exposed to rabies by a dog-bite. The owner, however, did tell me that the dog had had a fight in the yard with a big rat, and the dog had killed the rat. This dog was brought to my hospital with the first symptoms of rabies, and I told the lady, "This dog has rabies. The only thing I want to know is, have you treated the dog?" And she said, "Yes." I examined her hands for lacerations, as I have done 500 times in the last five years; that is something that I am always interested in—whether the owner has been exposed or not. Then she said, "Doctor, I do not believe the dog has rabies." I said, "All right, bring him to the hospital and leave him there. I will show you how he develops and tell you from day to day the symptoms as they appear." Then she said, "Now you have treated dogs for me for the last ten years and never fooled me yet, but I doubt you." I said, "Now there is only one thing I want you to do. You can call any qualified veterinarian in the city of New Orleans, and do not tell him where he is going, what he is going to do, and do not tell me who he is. You make the appointment with this man and bring him here to my hospital by appointment with me." That was carried out. A fellow practitioner came in, looked at the dog, and said, "This dog has rabies." She knew that I had not talked with the man because I had not seen him. So she did stand for the diagnosis of both of us, and she said, "Doctor, I am going further than this. I want a picture of this dog." So I held his head, held him on a table and got a photograph taken. And she inquired of everybody that knows and some that do not, and they have all agreed with her, that the rabies was incurred by rat-bite.

DR. C. E. COTTON: I was interested in Dr. Hershey's remarks relative to results of vaccination. Did I understand him to say the six-dose treatment of exposed animals had not proved reliable and that he was using the fourteen-dose treatment?

DR. HERSHEY: Yes, unless the bite has been around the face or head or mucous membrane. Then I give 18 or 21 doses.

DR. COTTON: You made some statements relative to the single-dose treatment. What is your experience with that?

DR. HERSHEY: Very satisfactory. I think I have used 350 or 400 doses in the last three years, and we have had no breaks. At the same time, I have advised close observation of all dogs given the single dose and I would say further that in some parts of our town I would not advise a single dose. I would not give it, because everything has been exposed.

DR. COTTON: It seems to me, that from the standpoint of practical control, men responsible for the control of this disease, when it appears in a neighborhood, should hesitate to accept the recommendation and conclusion from Dr. Eichhorn that vaccination should be used not as an adjuvant but to supplement sanitary control. I think we should reverse that, in the face of the report of the Conference; and sanitary control should be first and vaccination subject to that. They may tell you that muzzling and quarantining is impractical.

That is true, if you do not keep on the job constantly. When the disease appears in a country community particularly, if you give the necessary publicity, you can get them all interested. If you do not keep them interested, keep somebody on the job, they will relax, but from the standpoint of the practical control under the present situation, it seems to me we should still continue our quarantine provisions and use vaccination as a supplement.

DR. SCHOENING: I would like to ask Dr. Hershey how many of those 350 dogs that were vaccinated actually received exposure that he knew of.

DR. HERSHEY: I might say two-thirds of them at least. Now this is my conclusion. We have had it at this end of the town, east end, south end, etc. We have had it in every locality, and that is the reason I say we have had the exposure. Now as far as the quarantine is concerned, we have had the town in quarantine over three years, but it does not amount to a snap. Our local officials will not enforce it; so there we are.

DR. SCHOENING: In connection with the exposure of dogs, I would like to relate a few experiences we have had in experimental work, in which we have tried to produce the disease by natural exposure, that is, take a dog and expose it to the bites of a rabid dog. We recently put on an experiment where we had nine vaccinated dogs and eight control dogs. We exposed these dogs to the bites of three rabid dogs. The dogs used to furnish exposure were experimentally inoculated and when they showed symptoms of rabies were put into a cage with vaccinated dogs. They fought together. The vaccinated dogs were bitten. We took out the vaccinated dogs and put in the control dogs. They were attacked the same way and bitten, and then we waited for results. Out of the nine vaccinated dogs and eight control dogs, only two dogs died of rabies. Both were control dogs. One of the control dogs, however, received more exposure than the group of vaccinated dogs did. We could hardly draw any conclusions from this particular dog dying. The other control dog that died received the same exposure as the vaccinated dogs in the group, but the fact remains that six of the control dogs did not succumb to the disease. Yet, they were severely bitten by a rabid animal. Now this is rather difficult to explain. It just simply shows the very peculiar nature of rabies, and it brings up the question whether the virus is present in the saliva all the time, or whether there is some other factor that under certain conditions seems to make the virus very active, so that every animal bitten by a certain dog on a certain day will succumb to the disease, whereas, another time, none of your animals come down. All these factors have to be taken into consideration, it seems to me, when we study this question of vaccination. It is rather unfortunate that we do not have more data on the subject than we do, with the large number of dogs that have been vaccinated in this country in recent years. Compulsory vaccination usually is not put into effect in a community until the disease has been there for a year or two, and like all infectious diseases it has its peak, and then drops off of its own accord. It might possibly be that vaccination goes into effect at the time when the disease is going to drop anyway, and then also, in connection with vaccination, the destruction of stray dogs is usually employed, and licensing has taken place. All these factors are very useful in eradicating the disease, so that if the end result is good, it is pretty hard to say what caused it, whether it was the vaccination or these other measures that were employed in connection with vaccination. The fact that the end results are good, of course, is what we are after anyway, whether it is due to vaccination or other measures. If vaccination is a means of enforcing these other measures, it is doing good work.

DR. REICHEL: I do not want to prolong the discussion, but I will say the result brought out by Dr. Schoening in the exposure experiments he mentioned is up to expectancy—two out of eight dogs that were bitten contracted the disease; that is, 25 per cent—and I doubt whether rabies naturally would do any more than that. I do not want to parade that as a triumph of vaccination but I do want to say that I do not think anything will ever be accomplished in trying to work out experimentally the value of rabies vaccine in that way. Pasteur was the first one to bring out clearly that the results of vaccination would have to depend entirely upon experiments which would involve an infective dose, administered in such a way so that a large number of the control

animals would come down, and he was the first one to bring out that the intracranial injection would bring down 100 per cent of the control animals, or animals injected with virus. The value of vaccination will have to rest entirely upon laboratory experiments. It seems to me that the problem has to be tackled from two angles: First of all, we will have to quit experimenting with that infective dose administered in any other way but by the intracranial or intraocular method, and the animal must be vaccinated first and then exposed to the infective dose, and after that is done, infected first and then vaccinated. We need data also on the question as to whether one dose is as good as the same amount of vaccine administered in divided doses.

DR. I. K. ATHERTON: I would like to add the results of my experience in handling both curative and prophylactic methods. There are three dogs I want to call your attention to. I had two in which I had not injected anything to prevent the development of the disease. They died. The third was a very valuable Chow, and that was given the curative treatment. It did not develop rabies, but developed a very acute anaphylaxis. It lost its hair. It came out in large patches. But the dog got its coat back and never developed rabies.

Now we have had enzootic rabies in our locality, and personally I have used between 200 and 300 doses of the prophylactic, single-dose treatment. I did not have one single case of rabies develop, but we did have three or four cases of paralysis, and we had one case that came down which simulated rabies, and the dog went through all the manifestations of the dumb form of rabies. I isolated the case, and it was just a temporary condition that responded to time and he is just as good as any of the other dogs that had been inoculated. I feel that we have in our hands a measure which is of considerable merit and is worthy of our use.

---

### EXECUTIVE BOARD ELECTION

Executive Board elections in districts 2 and 3 have been in progress since February 7. District No. 2 includes the following states: Pennsylvania, New York, Maine, New Hampshire, Vermont, Rhode Island, Massachusetts, Connecticut, New Jersey and Delaware. District No. 3 includes: Illinois, Ohio, Wisconsin, Michigan and Indiana.

Nominations are now being received for members of the Executive Board to represent the districts named, for the new terms beginning at the close of the meeting in Minneapolis. The present terms of office of Drs. T. E. Munce and David S. White will expire at that time. The polls for nominations will remain open until April 7. On that date the nominating ballots will be canvassed and tickets made up, consisting of the five standing highest in each district. A ballot containing the names of the five nominees will be mailed to each member in the two districts, provided his dues for 1928 are paid. If this notice comes to the attention of any member in either of these districts who has not yet paid his dues for 1928, it would be in order for him to send a remittance for these dues immediately, so that he may participate in the election of a member of the Executive Board to represent his district. This is an opportunity which comes only once in five years and it should not be neglected.

## JOHNIN AS A DIAGNOSTIC AGENT IN PARATUBERCULOSIS\*

By H. K. WRIGHT, Philadelphia, Pa.

*Veterinary Department, H. K. Mulford Company*

As paratuberculosis or Johne's disease is not yet of widespread occurrence in this country, and may not be well known to those from sections where the disease has not yet been seen, we will briefly review the essential established facts regarding this disease, which are available in the literature.

Paratuberculosis, or Johne's disease, is a specific chronic infectious disease affecting principally cattle and, less frequently, sheep and goats. It is characterized by a periodic and persistent diarrhea, resulting in extreme emaciation which is usually accompanied by a thickening and corrugation of the intestinal mucous membrane. First described by Hansen and Hamilton in 1881,<sup>1</sup> the disease was subsequently studied bacteriologically, in 1895, by Johne and Frothingham, who were the first to recognize the causative organism, now known as *Mycobacterium paratuberculosis*. This is an acid-fast organism entirely distinct from the tubercle bacillus, although resembling it in its staining properties.

The disease was for some time regarded as a special form of intestinal tuberculosis and the acid-fast organisms found in the feces and affected intestinal mucous membrane were first believed to be avian tubercle bacilli and, later, a saprophytic variety of bovine tubercle bacilli. The investigations of Bang, M'Fadyean, Meyer and other workers subsequently revealed that the disease is entirely distinct from tuberculosis and constitutes a specific infectious disease. Twort and Ingram, in 1912, were the first to succeed in artificially cultivating the causative organism. M'Fadyean suggested the designation "Johne's disease" for this condition.

Cows from three to six years of age are reported to be affected more frequently, although the disease may occur in comparatively young calves. Natural infection takes place from the ingestion of food contaminated with the causative organism found in the feces of infected animals.

\*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

### OCCURRENCE

The presence of Johne's disease in the United States has been known for many years, Marshall<sup>2</sup> having reported observing this condition in a herd of cattle in Pennsylvania as early as 1898, although in this instance the true nature of the disease was not determined until several years later. The disease was first reported in this country in 1907, by Leonard Pearson.

Beach and Hastings<sup>3</sup> have reported a herd in Wisconsin known to be infected since 1903. More recent investigations<sup>4</sup> have revealed the presence of the disease in limited sections of eight or nine states, and it is believed that the disease is more prevalent than has been supposed.

### SYMPTOMS

The disease invariably develops in a very insidious way, since months and even years may elapse before it becomes evident. The symptoms consist in a gradual emaciation with absence of fever, but accompanied by a periodically appearing, but persistent, diarrhea in which the animals pass thin fetid feces. With the appearance of the diarrhea, there occurs also a marked reduction in the milk-yield. As the disease progresses, the attacks of diarrhea become more frequent and of longer duration, the emaciation becomes very marked and finally death supervenes. In exceptional cases the diarrhea may be absent.

On postmortem, in typical advanced cases, the mucous membrane of the affected parts of the intestine (particularly in the region of the ileo-caecal valve) is found to be four or five times the normal thickness, being transformed into irregular folds running transversely, or longitudinally, so as to resemble the convolutions of the brain. Careful microscopic examinations of the affected portions of the mucous membrane and adjacent lymph-glands will usually reveal the presence of the acid-fast organisms.

Once introduced into a herd, the disease gradually spreads and may occasion an annual loss by death of from 2 to 12 per cent, in addition to the indirect losses represented by decreased milk-production and general unthriftiness. As the causative agent is eliminated in the feces of infected animals, these offer a constant source of infection to other members of the herd and are a real menace. There is as yet no curative treatment known. Preventive immunization has been attempted by the subcutaneous injection of specially prepared suspensions of the living causative



organism in paraffin oil, as reported by Vallée and Ringard,<sup>5</sup> but the final judgment of the value of such treatment must await further work.

In our present state of knowledge, the disease can be most successfully attacked by the adoption of sanitary precautions involving the detection, isolation and subsequent destruction of infected animals.

The disease cannot be diagnosed clinically until the development of visible symptoms which usually involves a latency of months or even longer. This led to the search for a suitable diagnostic agent which would permit the detection of infected animals at an early stage of the disease.

#### DIAGNOSTIC AGENTS

O. Bang first pointed out that avian tuberculin will induce a marked reaction in some animals showing clinical symptoms of Johne's disease. Its usefulness as a diagnostic agent for this disease, however, is limited, since there is no positive evidence that it will reveal the disease in less advanced cases, and, furthermore, it cannot be regarded as specific. Its use also presents the objectionable feature of possibly causing reactions in tuberculous animals.

Twort and Ingram and, subsequently, M'Fadyean and his associates, and in this country Beach and Hastings, have demonstrated that there can be prepared from suitable cultures of Johne's bacillus, a product termed johnin, which is capable of causing marked febrile reactions in infected animals when administered intravenously. The method of preparation employed, in general, was similar to that followed in the preparation of tuberculin.

As Johne's bacillus is cultivated with difficulty except in culture media containing the products of growth of acid-fast organisms, or an extract of such organisms, johnin was originally prepared from cultures grown in broth to which had been added varying amounts of glycerin extracts of tubercle bacilli or other acid-fast organisms such as the timothy bacillus (*B. phlei*).

To avoid the objection that reactions might be induced in tuberculous animals by the small quantity of extract of tubercle bacilli present in the original culture medium, M'Fadyean<sup>6</sup> and his co-workers prepared their johnin from washed Johne's bacilli obtained from abundant surface growth in broth cultures. The organisms were removed and washed twice with sterile distilled



water and then extracted by steaming at least one hour with 5 per cent glycerin in distilled water. A second extraction with 5 per cent glycerin was carried out at 115° C. and the two extracts mixed. The organisms were removed by Berkefeld filtration and the final product adjusted so that 10 cc represented approximately the extract from 1 gm. of wet bacilli.

Beach and Hastings<sup>3</sup> prepared johnin from cultures obtained in broth containing meat extract and peptone in which there had previously been cultivated the grass bacillus of Karlensky or the grass bacillus of Moeller. These latter organisms were removed by filtration and the culture medium sterilized before seeding with John's bacillus. After obtaining suitable growth, the cultures were then heated to 60° C. for one to two hours, filtered and the original volume restored. Phenol (0.5%) was then added and the product stored for testing.

Vallée and Ringard<sup>5</sup> prepared johnin from cultures containing a glycerin extract of *B. phlei*, the final product being filtered free from organisms and containing the active substance of John's bacilli extracted without heat.

Johnin prepared by these methods has been shown by the various investigators to be capable of producing reactions in infected animals. In the case of the johnin in which the broth culture medium is incorporated in the final product, however, there exists the possibility that the reactions may, in part, be due to the foreign protein substances contained in the medium. M'Fadyean's method of separating the washed organisms from the medium and then extracting the active substances from them, would seem to remove this objection. However, by this method, the actual products of growth given off by the organisms which, theoretically, should be of value, are not utilized.

#### PREPARATION OF JOHNIN FROM CULTURES GROWN IN SYNTHETIC PROTEIN-FREE MEDIA

With the object of obtaining johnin which would be free from all foreign proteins and yet would contain the products of growth elaborated by the organisms, as well as the substances which could be extracted from them, the preparation of johnin was undertaken from cultures grown in a synthetic protein-free medium.\* To avoid the possibility of alteration by subjection to heat, the entire process is carried out without the use of heat. The method of preparation employed is as follows:

\*The johnin on which these reports are based was prepared in the Mulford Laboratories by John Glenn.

A pure culture of Johne's bacillus, known as strain 1545, which was originally obtained from Dr. E. G. Hastings, is grown in Long's synthetic medium to which has been added about 0.2 per cent dead timothy bacilli (*B. phlei*), the reaction being adjusted to about pH 6.8.

The culture medium is prepared in accordance with the published formula of Long, as follows:

Glycerin.....	50 cc
Asparagin.....	5 grams
Ammonium citrate.....	5 grams
Potassium phosphate.....	3 grams
Magnesium sulphate.....	1 gram
Iron and ammonium citrate.....	0.05 gram
Sodium carbonate.....	3 grams
Sodium chlorid.....	2 grams
Distilled water, q. s.....	1000 cc

The culture medium is filled into cotton-plugged, one-litre, non-sol, glass bottles, each containing about 200 cc of media. Sterilization is effected by autoclaving.

Each bottle then has added to it about 0.2 per cent dead timothy bacilli (*B. phlei*) obtained by growing in glycerin broth, the organisms being subsequently killed by heat and collected by centrifuging. After the addition of the dead timothy bacilli, the bottles are incubated for approximately seven days and examined macroscopically for sterility.

If the medium is sterile, it is planted with the pure culture of Johne's bacillus grown by the same method here outlined. The bottles are then laid on their sides in order to obtain a maximum surface growth which amounts to about 20 square inches for the 200 cc of media. The bottles are incubated for from four to six months, at 37 to 38° C., a luxuriant surface growth being obtained, as may be noted from figure 1.

At the end of this time each bottle is examined macroscopically for purity and abundance of growth. If satisfactory, the entire contents are passed through a Buchner filter. The collected organisms are then plasmolysed with ether three times, to remove the protective fatty substances, the organisms being suspended in the ether for about three days each time. The organisms are then extracted with distilled water three times, each extraction requiring about three days, enough water being used so that, when the original filtrate is mixed with the extract, the volume equals the original volume of the culture medium.

The organisms are then removed from the mixture and the product sterilized by candle filtration, after which there is added

0.5 per cent phenol as a preservative. *No heat is used in the process.* The final product is tested for sterility in dextrose broth in fermentation tubes incubated at 37.5° C. and examined at the end of seven days.

As the original culture medium is protein-free, it is obvious that the final product contains no foreign proteins other than the very small amount contained in the 0.2 per cent dead timothy bacilli added to the culture medium, which has been regarded by Vallée and Ringard as not apt to produce specific reactions in animals infected with either tuberculosis or paratuberculosis. The substances contained in johnin prepared in this manner include the products of growth elaborated by Johne's bacillus, unaltered by heat, and also the specific products extracted from

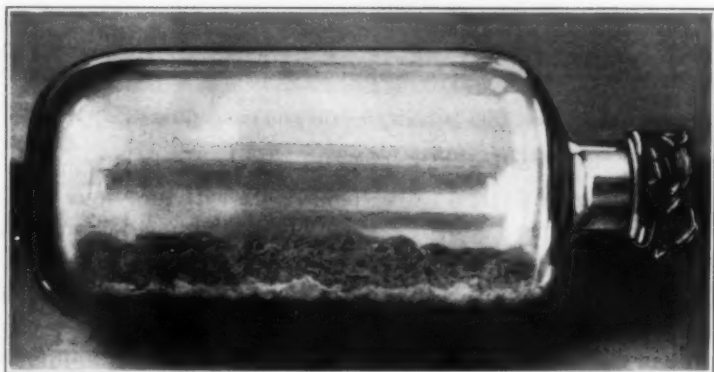


FIG. 1. Bottle showing surface growth of Johne bacilli in Long's synthetic medium after incubation for six months. Strain 1545.

the organisms themselves. No organisms are present, these having been removed by filtration. It is logical to expect that a product prepared in this manner would be specific for Johne's disease and would prove capable of causing marked reactions when injected into infected animals. How the product behaved in this respect will be seen from the results reported from its use in the field.

#### GUINEA-PIG TOXICITY TESTS

In order that ample material would be available to permit tests being carried out by various investigators, all using the same identical product, a single lot of johnin, known as lot VI, was prepared comprising approximately 28 liters of finished product. Before submitting this johnin for field trial it was tested

on guinea pigs for toxicity. Three guinea pigs were injected subcutaneously with 3 cc each and four were injected intraperitoneally with 5 cc each. The guinea pigs did not show any noticeable reactions. All maintained their weights and remained normal for seven days, demonstrating its non-toxicity for these animals in the doses employed.

#### FIELD TESTS

Through the cooperation of veterinarians located in widely separated parts of the country, to whom we here extend our thanks and appreciation, this lot of johnin has been quite extensively employed in testing cattle in herds known to be infected with John's disease. Reports have been received to date on a total of 343 cattle tested in known-infected herds, which may briefly be summarized as follows:

Cattle tested.....	343
Positive reactions.....	91 (26.5%)
"Suspicious" reactions.....	51 (14.8%)
Absence of reaction.....	193 (56.2%)
Regarded as "no test" due to high pre-injection temperatures	8 (2.3%)

#### METHOD OF CONDUCTING TESTS

The testing of known infected animals with previous lots of johnin similarly prepared, in varying dosage, having demonstrated that equally marked reactions were obtained with a 5-cc dose as with larger amounts, a 5-cc dose was employed in most of the tests reported here.

In conducting these tests, after taking sufficient pre-injection temperatures, to establish that the animal's temperature was normal, the johnin was then injected intravenously and post-injection temperatures taken and recorded, beginning one half or one hour after injection and continuing at hourly or two-hour intervals for a period of ten to twelve hours. When the johnin is injected intravenously, it has been found that the reactions will generally occur well within this interval.

The reactions of infected animals to johnin have little to distinguish them from those obtained in tuberculous animals by the subcutaneous tuberculin test, a similar temperature curve occurring. In some instances an elevation of temperature may be noted as early as one hour following intravenous injection, though, as a rule, the reaction commonly occurs between the third and eighth hours. In some infected animals there may also occur a constitutional reaction manifested by muscular trembling, purging, roughened hair-coat, and at times a more or less marked

TABLE I.—Typical positive reactions to johnin test on cattle in known-infected herd (Herd "A"). Test conducted June 8-9, 1927.

Cow	Breed	Age (Yrs.)	Pre-Injection Temperatures (Hours)			Johnin (cc)	Post-Injection Temperatures (Hours)												Maximum Before Injection	Maximum After Injection	Rise
			6	4	2		1	2	3	4	5	6	7	8	9	10	11	12			
6	Jersey	5 1/6	1.6	1.2	1.5	5.0	1.61	1.41	1.82	2.82	4.44	4.48	4.02	6.22	2.20	1.2	1.6	4.8	3.2		
8	Jersey	6 3/4	1.7	1.6	1.8	5.0	1.52	2.84	0.40	3.23	1.20	2.02	0.21	2.14	1.0	1.8	4.0	4.0	2.2		
38	Jersey	5 5/12	1.8	0.9	1.9	5.0	1.02	2.22	6.38	4.84	6.26	2.62	2.21	2.08	1.9	4.8	4.8	2.9			
42	Jersey	2 3/4	1.2	1.4	1.8	5.0	1.82	0.22	4.63	4.40	4.51	5.28	2.01	8.14	1.8	4.5	4.5	2.7			
45	Jersey	4 2/3	1.0	1.2	1.6	5.0	1.22	6.22	2.30	4.84	4.45	1.82	0.14	2.12	1.6	4.8	4.8	3.2			
47	Jersey	2 1/2	1.6	1.4	1.8	5.0	1.42	8.44	2.40	3.23	2.24	2.41	6.20	1.82	4.2	1.8	4.2	2.4			
59	Jersey	13 1/3	1.2	1.0	1.0	5.0	2.03	2.38	4.25	0.46	3.02	2.22	0.20	1.62	1.2	5.0	5.0	3.8			
*29	Gr. Jersey	3 1/3	1.0	0.9	1.4	5.0	1.53	0.48	5.26	0.52	4.43	0.20	1.41	0.06	1.4	6.0	6.0	4.6			
*84A	Ayrshire	13 3/4	1.0	1.4	1.6	5.0	1.62	4.28	3.12	8.32	2.24	2.62	0.22	2.16	2.0	1.6	3.2	1.6			
*85A	Jersey	4 2/3	1.0	1.4	1.4	5.0	2.02	4.30	3.42	2.62	4.20	2.02	0.21	6.20	2.0	1.4	3.4	2.0			
*88A	Jersey	1 11/12	2.2	1.6	1.6	5.0	1.61	8.32	2.28	3.03	4.28	2.62	2.22	4.22	2.2	2.2	3.4	1.2			
90A	Ayrshire	1 1/3	2.8	2.0	2.2	5.0	2.43	4.36	4.66	2.58	5.24	0.34	2.62	2.20	2.8	6.2	6.2	3.4			

\*Cows 29, 84A, 85A and 88A were slaughtered within two days after test. All showed positive lesions of John's disease on autopsy and acid-fast bacteria were demonstrated in each case.

dyspnea. These reactions are believed to be of diagnostic significance, Beach and Hastings having reported in their work that they never observed a roughened hair-coat that was not accompanied by a thermal reaction.

#### INTERPRETATION OF THE THERMAL REACTION

In interpreting the tests reported here, a rise of  $2^{\circ}\text{F}$ . or more from the highest pre-injection temperature has been regarded as a positive reaction indicative of infection. Where the post-injection temperatures show a rise of  $1.5^{\circ}\text{F}$ ., but less than  $2^{\circ}$ , the test has been interpreted as "suspicious," or rather, "doubtful," in view of our limited knowledge of the true significance of these border-line reactions.

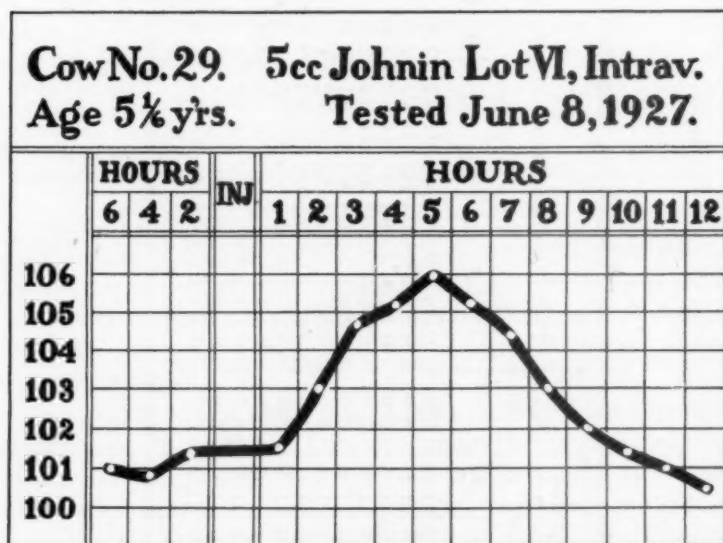


CHART I. Reaction of cow infected with John's disease (Herd "A").

In these doubtful reactions, an elevation of temperature which is sustained for two or three hours is believed of greater diagnostic significance than a single high temperature not sustained.

#### TYPICAL POSITIVE REACTIONS

In table I will be seen the temperature record of a group of typical positive reactions obtained in testing a known-infected herd comprising 207 cattle, this herd being an "accredited tuberculosis-free" herd. Within the twenty months previous to the test, six animals in this herd are reported to have died of John's disease and 21 animals had been slaughtered because of the



disease. The johnin test revealed a total of 67 animals regarded as positive reactors, 26 animals giving "doubtful" or "suspicious" reactions and 114 animals giving no reaction. For brevity we have included in table I only a sufficient number of animals to serve in illustrating typical positive reactions. The reaction of cow 29 is shown graphically in chart I.

It should be noted that, with the exception of animals 84A and 88A, there occurred in each animal a typical "temperature curve" with a rise of  $2^{\circ}$  or more over the highest recorded pre-injection temperature. In cow 84A there was a rise of only  $1.6^{\circ}$  over the highest pre-injection temperature, so that, judging this animal merely on the temperature record, one would be inclined to classify it as "suspicious." Although we have no definite information, presumably this animal showed clinical signs of the disease since it was among those destroyed following the test. It showed typical lesions on autopsy and acid-fast bacteria were demonstrated in the affected tissues.

Cow 88A gave a rise of only  $1.2^{\circ}$  from the highest pre-injection temperature and would likewise be classified as "suspicious" if judged only from the temperature record. This animal, however, was likewise selected for slaughter, presumably for the same reason as Cow 84A. On autopsy, typical lesions were found and acid-fast bacteria demonstrated.

Cows 29 and 85A also were slaughtered, typical lesions being found and acid-fast bacteria demonstrated. The remaining animals of this group have not as yet been slaughtered.

#### RESULTS OBTAINED IN TESTING HERD "B"

In another herd designated as herd "B," forty cows and one bull were tested with johnin (lot VI), using a 5-cc dose injected intravenously. This herd is known to have been infected since 1918, since which time all animals showing physical symptoms had been slaughtered. In a total of nine animals slaughtered since 1918, acid-fast organisms were found in all but one and this animal showed typical intestinal lesions. On testing this herd with johnin (lot VI), in April of this year two typical positive reactions were obtained and three animals gave suspicious reactions. In the remaining 36 animals, the post-injection temperatures remained uniformly normal and no physical reaction of any kind was noted.

That johnin prepared in the manner described is without appreciable effect on animals not infected with Johne's disease may

be judged from the fact that, in a total of 343 animals tested in various known-infected herds, there were 193 (56.2%) which showed no elevation of temperature nor any physical reaction.

#### TESTS ON CATTLE IN SUPPOSEDLY NON-INFECTED HERD "C"

Desiring further evidence that johnin prepared in this manner has no appreciable effect on animals free from John's disease, 26 milking cows in a supposedly non-infected herd (herd "C") were tested. These animals are members of an assembled herd of about 250 cows producing certified milk. As the manager was somewhat reluctant to have the test conducted on cows whose milk entered into the certified product, we were permitted to test only eleven cows of the active certified herd. We were given

TABLE II—*Johnin test on cattle in presumably non-infected herd (Herd "C").*  
Group I—Cows in certified milk unit. Test conducted, August 28, 1927.

NO. OF ANIMAL	AGE (YRS)	PRE-INJECTION TEMPERATURES (HOURS)			JOHNIN LOT VI (CC)	POST-INJECTION TEMPERATURES (HOURS)							
		15½	2	1		½	1½	2½	3½	4½	5½	6½	9
7H25	8	2.2	1.6	1.0	5.0	1.01	1.31	1.01	1.01	1.30	0.81	1.02	0
7H18	5	1.8	1.6	1.2	5.0	1.61	1.91	2.10	1.31	1.41	1.32	4	4
7H1	4	2.4	1.0	1.2	5.0	1.62	0.12	0.81	1.11	1.11	1.03	1	1
7H26	2	2.4	2.2	1.8	5.0	2.01	1.61	1.51	2.07	1.41	1.62	4	4
7H17	6	1.8	1.1	1.0	5.0	1.02	0.20	1.41	1.01	1.21	1.12	3	3
7H22	6	1.6	1.6	1.4	5.0	1.01	0.04	0.21	1.50	1.40	1.52	6	6
7H9	9	2.0	1.0	1.2	5.0	0.62	0.18	1.41	1.51	1.41	1.52	0	0
7H23	6	1.8	0.8	0.8	5.0	0.81	1.21	1.31	1.01	1.11	1.14	2	2
7H11	5	2.0	0.8	1.0	5.0	1.21	1.01	1.21	1.10	1.00	1.02	1	1
7H2	3	1.8	1.0	1.1	5.0	0.70	0.81	1.21	1.01	1.11	1.51	3	3
7H12	6	2.2	1.2	1.6	5.0	1.01	1.61	1.61	1.71	1.51	1.61	7	7

a free hand, however, in testing cattle temporarily isolated from the producing certified herd, because of mastitis, cow pox, minor injuries, etc.

The results of the johnin test on the eleven normal healthy cows in the certified herd are given in table II. Pre-injection temperatures were taken in the evening of the day prior to the test and also at two hours and one hour before injection. Each cow was injected intravenously with a 5-cc dose of johnin (lot VI). There was no physical disturbance whatsoever following injection and in every instance the post-injection temperatures remained consistently normal. The slightly higher temperatures recorded at the ninth hour may be attributed to the fact that the cattle had been fed just previously.

The record of the tests on the fifteen cows in the isolated "hospital unit" is given in table III. Twelve of these cows were injected intravenously with 5 cc of johnin (lot VI). Three cows, taken at random (2418, 2392 and 2244) were injected with 10 cc intravenously.

None of the twelve cows receiving a 5-cc dose showed any physical reaction whatsoever nor was there any significant rise in the post-injection temperatures.

Of the three cows injected with 10 cc of johnin, the post-injection temperatures of one remained normal. The other two cows (2392 and 2244) showed an increase. Cow 2392 registered a

TABLE III—*Johnin test on cattle in presumably non-infected herd (Herd "C").*  
Group II—Cows isolated in "hospital unit." Test conducted, August 28, 1927.

NO. OF ANIMAL	PRE-INJECTION TEMPERATURES (HOURS)			JOHNIN LOT VI (cc)	POST-INJECTION TEMPERATURES (HOURS)								
	15½	2	1		½	1½	2½	3½	4½	5½	6½	9	
6H4	1.6	1.8	1.8	5.0	1.2	1.8	{ 3.0	2.8	2.0	2.2	2.1	2.1	
2432	1.6	2.0	1.0	5.0	1.6	2.4	2.6	2.2	2.1	2.0	2.4	2.2	
6J12	1.6	2.0	1.5	5.0	1.2	1.3	1.3	1.4	1.4	1.3	1.4	1.9	
6H36	1.2	1.2	1.2	5.0	1.4	1.0	1.0	1.4	1.2	2.2	2.2	2.3	
6H87	2.2	2.1	1.6	5.0	1.4	1.4	{ 3.0	2.6	2.2	2.4	2.0	2.2	
2071	2.6	1.6	1.2	5.0	1.0	1.0	1.5	1.2	0.8	1.1	1.8	1.6	
6H13	1.2	1.8	1.5	5.0	1.6	1.5	1.3	1.4	1.0	1.4	1.2	1.7	
2125	2.0	1.8	1.4	5.0	1.8	{ 3.2	{ 2.7	2.5	2.4	2.4	1.9	2.2	
7J2	1.4	1.6	1.2	5.0	1.3	1.2	1.4	1.3	1.1	1.3	1.2	1.6	
380296	1.4	1.4	1.4	5.0	1.3	2.4	2.6	2.1	1.8	1.4	1.4	1.3	
7H10	2.4	2.2	1.6	5.0	2.0	{ 3.0	1.6	1.5	2.4	2.4	2.0	2.3	
7H8	2.0	1.8	1.2	5.0	1.8	1.2	1.2	1.4	1.0	1.4	1.6	1.5	
2418	1.8	1.6	1.6	10.0	1.6	2.2	2.3	2.0	2.1	2.4	1.8	2.6	
2392	2.0	1.8	1.7	10.0	1.6	{ 3.2	{ 4.1	2.6	1.9	1.2	1.2	1.0	
						{ 3.4	{ 4.0						
2244	1.0	1.0	1.0	10.0	1.6	{ 3.8	{ 4.8	5.0	5.0	3.0	3.1	1.1	
							{ 4.6						

temperature of 103.4° at 1½ hours after injection, with 104° at 2½ hours, after which time the temperature returned to normal. These temperatures were checked, the second readings being respectively 103.2° and 104.1° F. In comparison with the highest morning pre-injection temperature, this constitutes a rise of 2.3° F. It must, therefore, be regarded as a "doubtful" or "suspicious" reaction.

In cow 2244, a typical positive temperature reaction was obtained following the injection of 10 cc of johnin. As will be

TABLE IV—"Doubtful" reactions to johnin test on cattle in known-infected herd (Herd "A"). Test conducted, June 8, 1927.

Cow	Breed	Age (Yrs.)	Pre-Injection Temperatures (Hours)			Johnin (cc)	Post-Injection Temperatures (Hours)												Maximum Before Injection	Maximum After Injection	Rise
			6	4	2		1	2	3	4	5	6	7	8	9	10	11	12			
10	Jersey	12 7/12	1.5	1.4	1.7	5.0	1.7	2.4	2.4	2.6	1.4	3.0	3.2	3.0	2.8	2.8	2.6	1.6	1.7	3.2	1.5
11	Jersey	7 3/4	0.4	1.0	1.6	5.0	1.2	1.5	2.0	2.2	2.8	2.6	3.4	3.4	3.2	2.1	4.3	2.3	1.6	3.4	1.8
13	Jersey	9 3/4	1.8	1.4	1.7	5.0	2.1	1.8	2.6	3.0	2.8	3.0	3.0	2.6	2.2	2.2	2.4	1.8	1.6	3.0	1.2
22	Jersey	8 1/6	1.1	1.0	1.5	5.0	1.4	2.8	3.2	1.6	3.0	2.2	4.2	0.1	8.2	0.1	8.1	1.2	1.5	3.2	1.7
24	Jersey	3 7/12	1.4	1.4	1.4	5.0	2.0	2.8	3.0	3.4	3.2	2.8	4.2	2.2	0.2	0.1	8.1	1.2	1.4	3.4	2.0
28	Jersey	5 3/4	1.0	0.9	1.5	5.0	1.7	3.4	3.0	2.6	4.2	2.2	1.2	2.0	1.4	1.0	1.8	1.0	1.5	3.4	1.9
50	Jersey	3 2/3	2.2	1.3	1.9	5.0	1.8	3.0	3.0	3.3	3.4	2.6	2.2	4.2	2.2	1.4	1.8	1.2	2.2	3.6	1.4
53	Jersey	2 1/2	1.4	1.0	1.6	5.0	1.4	2.6	3.2	3.4	3.0	2.6	2.0	2.1	4.1	0.1	0.0	0.2	1.6	3.6	1.4
57	Jersey	10 2/3	1.6	1.0	1.2	5.0	2.0	4.2	2.8	3.0	3.4	3.2	3.4	3.2	3.3	2.3	4.3	1.3	1.6	3.6	1.8
63	Jersey	7	1.4	1.0	1.2	5.0	1.4	2.4	3.8	3.0	2.0	2.0	1.6	1.4	1.4	1.8	1.6	1.2	1.4	3.8	2.0
68	Jersey	8 1/6	0.8	0.8	1.4	5.0	1.0	1.6	3.2	2.8	2.2	1.8	1.8	1.0	1.0	1.4	1.0	1.2	1.4	3.2	1.8
80	Jersey	4 1/6	1.0	0.4	1.6	5.0	1.6	2.6	3.0	3.0	2.6	2.3	1.6	1.0	1.0	0.8	0.8	0.8	1.6	3.0	1.4

noted from table III, the temperature rose to 105.0° 3½ hours following injection and was sustained for another hour, after which it gradually dropped to normal. This animal showed no physical symptom of the disease. However, coincident with the elevation of temperature, there occurred a marked looseness of the bowels, the feces being of much thinner consistency than previously. A sample of feces was examined microscopically and after continued search it was possible to find a few acid-fast organisms, apparently resembling Johne's bacillus. Based on our experience with this lot of johnin, we are inclined to regard this animal as infected.

Although no clinical cases of Johne's disease have ever been recognized in this herd, the finding of an infected animal is not beyond the bounds of reason, when it is considered that replacements are constantly being made with cattle shipped in from other sections.

#### "DOUBTFUL" OR "SUSPICIOUS" REACTIONS

As previously explained, in the case of animals whose post-injection temperatures showed a rise of 1.5° F. but less than 2° F., or where there occurred a single elevation of temperature which was not sustained, the tests have been interpreted as "suspicious" or "doubtful." As examples of the reactions classified as "doubtful" or "suspicious," the temperature records of ten such cases, selected from the tests of herd A, have been grouped in table IV. Just what is the true significance of these border-line reactions, we are not as yet in a position to state and, for this reason, regard all such reactions as "doubtful." Animals giving such reactions should preferably be isolated and retested at a later date.

#### JOHNIN TESTS ON CALVES

As being of particular interest, we have grouped in table V the results reported from the testing of calves in the same infected herd "A." Temperature reactions in tuberculin tests conducted on calves under four months of age being generally regarded as unreliable, we were not inclined to attach much significance to these apparent reactions. It must be noted, however, that the pre-injection temperatures are fairly uniform while the post-injection temperatures, following the intravenous administration of 3 cc of johnin, are uniformly elevated. Of this group, calf 12A which was six months old, and calf 14A which was four months of age, were slaughtered. Typical lesions of Johne's

TABLE V—*Johnin* test on calves in known-infected herd (Herd "A"). Test conducted, June 9, 1927.

TABLE V— <i>Johnin</i> test on calves in known-infected herd (Herd "A"). Test conducted, June 9, 1921.																					
No. OF ANI- MAL	BREED	SEX	AGE	PRE-INJECTION TEMPERATURES (HOURS)			JOHNIN (CC)	POST-INJECTION TEMPERATURES (HOURS)										MAXIMUM BEFORE INJECTION	MAXIMUM AFTER INJECTION	RISE	
				6½	4½	2½		½	1½	2½	3½	4½	5½	6½	7½	8½	9½				10½
7A	Jersey	M	2½ mos.	1.8	2.0	2.0	3.0	3.6	4.6	5.8	5.6	4.4	4.0	3.2	2.8	2.6	2.0	5.8	3.8		
9A	Ayrshire	M	3 mos.	2.0	2.4	2.3	3.0	4.6	5.2	5.0	4.2	4.0	3.6	3.4	3.8	3.4	2.4	5.2	2.8		
10A	Jersey	F	3 mos.	2.0	2.0	2.2	3.0	3.6	4.4	4.5	4.4	4.2	4.0	3.8	3.4	3.4	2.2	5.4	3.2		
11A	Jersey	F	4 mos.	3.6	4.6	4.6	3.0	6.0	6.5	4.5	6.5	4.6	4.3	4.0	3.8	4.0	4.6	6.0	1.4		
*12A	Ayrshire	F	6 mos.	3.2	3.8	3.4	3.0	4.2	4.2	4.5	4.6	4.4	4.3	4.0	3.6	3.4	3.8	5.0	1.2		
*14A	Ayrshire	F	4 mos.	3.0	2.8	2.8	3.0	4.2	3.6	3.4	3.2	4.0	4.0	3.6	3.2	3.0	3.0	4.2	1.2		
16A	Jersey	F	6 mos.	2.4	1.8	2.1	3.0	3.0	4.4	4.5	4.6	3.6	4.0	3.6	2.8	3.0	2.4	6.3	3.9		
18A	Jersey	M	1½ mos.	1.8	1.0	1.0	3.0	3.4	3.4	4.0	4.5	4.4	4.4	3.8	3.0	3.0	1.8	5.4	3.6		
19A	Jersey	F	1½ mos.	2.0	2.0	2.3	3.0	3.4	4.0	4.8	4.5	4.4	4.4	3.8	3.0	3.0	2.3	5.4	3.1		
20A	Jersey	F	1¼ mos.	2.6	1.8	1.7	3.0	2.6	2.8	2.4	3.2	3.0	3.0	3.2	2.4	2.4	2.6	3.2	0.6		
27A	Jersey	F	2 mos.	2.0	1.8	2.0	3.0	3.4	4.0	4.2	4.4	4.2	4.4	4.0	3.4	3.4	2.0	4.4	2.4		
31A	Jersey	F	4 days	1.4	1.8	2.1	3.0	2.2	2.6	2.9	3.0	3.4	3.2	2.6	2.3	2.8	2.1	3.6	1.5		

observed in each case and acid-fast organisms

\*Calves 12A and 14A were slaughtered on the day following the test. Typical lesions of John's disease were observed in each case and acid-fast organisms demonstrated.



disease were reported at autopsy and acid-fast organisms demonstrated in each case.

**JOHNIN TESTS ON COW 1 (SUPPOSEDLY NORMAL) AND COW 2 (INFECTED)**

A rather interesting experience was reported in testing with johnin a cow which had been removed from an infected herd. Desiring to have a control animal, a supposedly normal cow was tested at the same time. Much to our surprise, the supposedly normal animal gave as typical a reaction as the infected cow, as may be seen from the accompanying graphic temperature charts

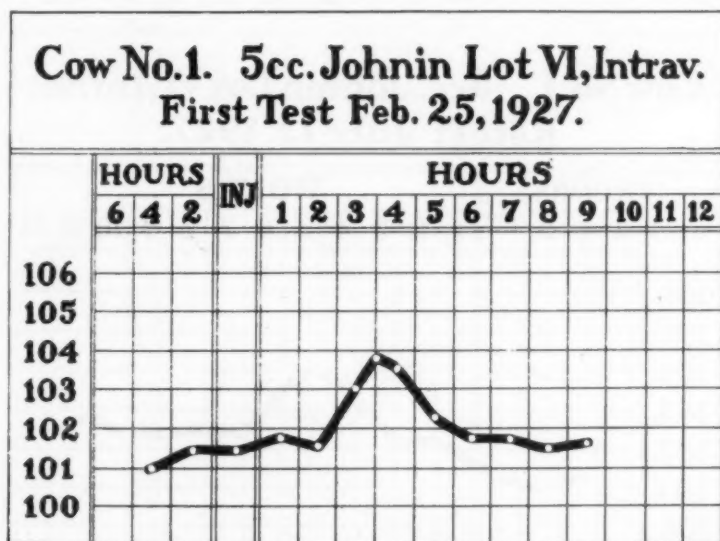


CHART II. Reaction of supposed normal cow to original test.

II and IV. In rectal scrapings from the infected cow, designated as 2, acid-fast organisms were demonstrated. No rectal scrapings were examined from the "control" cow, designated as 1, but this animal was retested 4½ months later with the same lot of johnin, using the same dose as previously. In the retest, a typical positive reaction was again obtained, as recorded in chart III. Investigation of the history of cow 2 reveals that she was stabled along side a typical advanced case of Johne's disease about three months previous to the first test. Furthermore, it was subsequently learned that it originally came from a herd in which Johne's disease is known to exist.

## JOHNIN TESTS ON KNOWN-TUBERCULOUS CATTLE

As the johnin prepared in the manner described is obviously free from any extract of tubercle bacilli, it was believed that it would not be capable of causing reactions in tuberculous animals. A group of known-tuberculous cattle was accordingly tested in co-operation with Dr. H. W. Turner, of the Pennsylvania Bureau of Animal Industry, who has reported the results in a separate paper.

## A COMPARATIVELY UNIFORM PRODUCT OBTAINABLE

That the method of preparation outlined will yield a fairly uniform johnin, capable of producing reliable reactions in

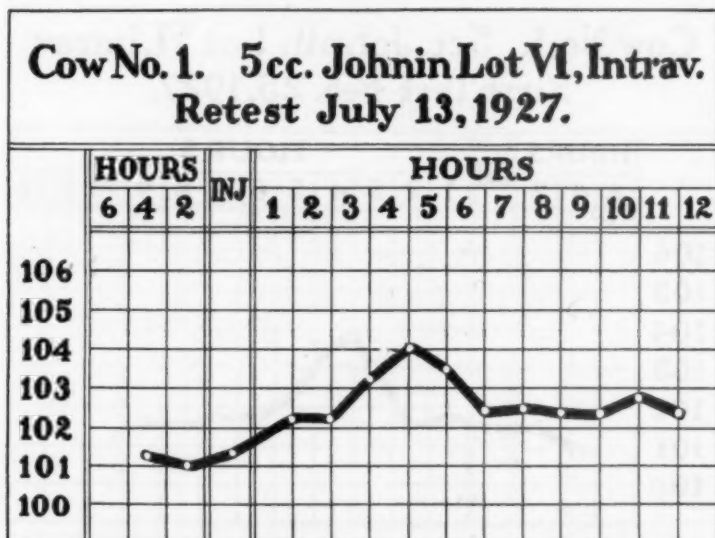


CHART III. Reaction to retest 4½ months after first test. Although regarded as supposedly normal prior to test, it was subsequently learned that this animal came from a herd in which John's disease exists.

infected animals, is demonstrated by comparative tests conducted with a subsequent lot, known as lot VII, comprising 33 liters of finished product. This was tested on five cattle in the infected herd "A," these animals having been tested two months previously with lot VI, in the same dosage. The comparative results of the two tests are shown in table VI.

The post-injection temperatures in the retests were taken beginning one-half hour after injection instead of one hour as in the original test. The readings were continued at hourly intervals. There is, therefore, a difference of one-half hour in the readings of the post-injection temperatures in the two tests.

TABLE VI—Comparative reactions obtained in original test with johnin (Lot VI) and retest (Lot VII) on five cattle in known-infected herd (Herd "A"). Original test, June 8, 1927. Retest, August 12, 1927. Dose of johnin, 5 cc intravenously in all cases.

No. of Animal	Test	Age (Yrs.)	Pre-Injection Temperatures (Hours)				Post-Injection Temperatures (Hours)												Maximum Before Injection	Maximum After Injection	Rise
			6	4	2	Inj.	1	2	3	4	5	6	7	8	9	10	11	12			
11	Orig.	7¾	0.4	1.0	1.6		1.2	1.5	2.0	2.2	2.8	2.6	3.4	3.4	3.2	1.4	3.2	3.2	1.6	3.4	1.8
	Retest			1.1	1.5	1.7		3.0	3.7	4.0	4.6	5.0	5.5	3.6	3.6	3.0	2.6	2.2	2.3	1.7	5.5
42	Orig.	2¾	1.2	1.4	1.8		1.8	2.0	2.4	2.6	3.4	4.0	4.5	4.5	2.8	2.0	1.8	1.4	1.8	4.5	2.7
	Retest			0.8	1.1	2.2		2.6	2.0	3.3	3.4	3.0	3.4	3.2	2.8	2.3	2.3	1.2	1.4	2.2	3.4
63	Orig.	7	1.4	1.0	1.2		1.4	2.4	3.8	3.0	2.0	2.0	1.6	1.4	1.4	1.8	1.8	1.6	1.4	3.8	2.4
	Retest			1.7	1.7	1.8		2.2	3.2	3.4	4.2	4.1	4.0	3.0	2.4	2.5	2.4	2.3	2.0	1.8	4.2
72	Orig.	4 5-12	1.6	0.6	1.8		1.0	2.2	2.4	3.8	5.4	5.0	4.0	2.2	1.4	1.4	1.2	1.4	1.8	5.4	3.6
	Retest			1.4	1.8	2.1		2.4	2.7	2.6	3.2	3.2	3.2	2.9	2.8	2.6	2.6	2.6	2.3	2.1	3.2
1A	Orig.	2½	2.0	1.4	1.5		0.2	4.4	4.8	4.2	4.2	3.8	2.4	2.6	2.6	2.2	2.0	2.4	2.0	4.8	2.8
	Retest			1.6	1.8	2.0		2.3	2.9	3.8	4.2	4.0	4.2	3.8	4.4	4.3	5.2	4.7	2.0	5.2	3.2

For convenience in comparing the results, we have disregarded this slight difference and recorded the temperatures as though they had all been taken at the same time following injection. It will be observed that the reactions in both tests are very similar. Four days after the second test, the cattle were slaughtered. All showed lesions of Johne's disease and an abundance of acid-fast bacteria.

#### SUMMARY

There is outlined a method of preparing johnin differing from previously described methods in that the product is obtained from cultures grown in a synthetic protein-free culture medium,

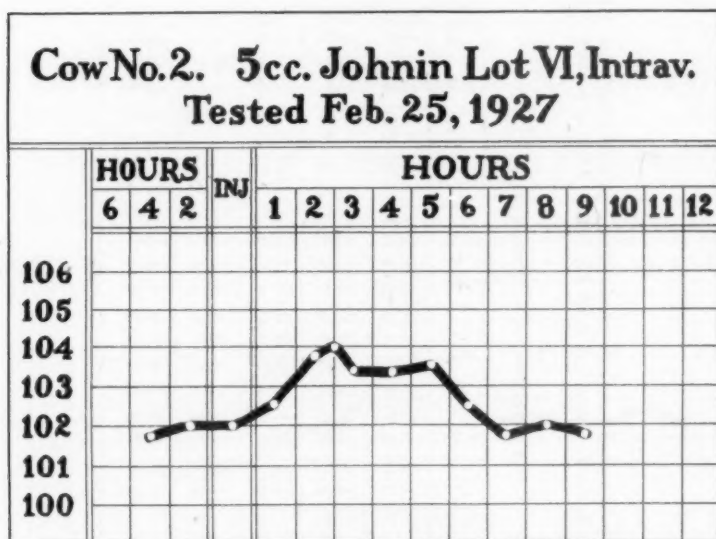


CHART IV. Reaction of infected cow.

thereby eliminating the possibility of non-specific reactions due to foreign proteins. The entire preparation is completed without exposure to heat and the johnin contains the products of growth elaborated by Johne's bacillus, and also the substances extracted from the organisms.

Johnin prepared in this manner, when tested on cattle in known-infected herds, has proven capable of producing marked febrile reactions in infected animals.

It has been found to be without appreciable effect on normal, mature cattle in doses of 5 cc.

The tests conducted with johnin prepared from the Hastings

strain, identified as strain 1545, have demonstrated the specificity of this strain.

The testing of cattle with johnin prepared in the manner described will materially assist in the practical control of the disease by enabling the detection of infected animals before the development of physical symptoms.

#### REFERENCES

- <sup>1</sup>Hutyra & Marek: Pathology and Therapeutics of the Diseases of Domestic Animals (3rd ed.; Alexander Eger, Chicago, 1926), I, pp. 749-756.  
<sup>2</sup>Marshall, C. J.: Univ. Penn. Bul., Vet. Ext. Quar., xxiv (1924), 13.  
<sup>3</sup>Beach & Hastings: John's disease and its detection. Jour. Inf. Dis., xxx (1922), pp. 71-79.  
<sup>4</sup>Mohler, J. R.: The address of the president. Jour. A. V. M. A., lxx (1927), n. s. 23 (6), pp. 707-708.  
<sup>5</sup>Vallée & Ringard: Researches regarding John's disease. Revue Gen. Med. Vet., xxxv (1926), pp. 1-9. Also Jour. Comp. Path. & Therap., xxxix (1926), part 4.  
<sup>6</sup>M'Fadyean, Sheather & Edwards: John's disease. The reactions of animals to johnin. Jour. Comp. Path. & Therap., xxix (1916), p. 236.

#### DISCUSSION

DR. M. DORSET: I was very much interested in Dr. Wright's paper. When I saw the photograph of his culture I thought the first thing I should do would be to congratulate him on the remarkably fine growth of John's bacillus that he seems to have obtained. I have not attempted myself, personally, to cultivate John's bacillus, but I know many have had tremendous difficulty with it and have been hardly able to get it to grow at all. Of course, a good growth of John's bacillus must be the basis of good johnin. If you do not get a good growth of John's bacillus, you can not expect a good johnin. In these injections of 10 cc and 5 cc, intravenously, what dose of the original fluid do they represent? In other words, in terms of tuberculin, we speak of the extent to which it is concentrated. Is this johnin concentrated ten times, or is it the same dilution as the original culture fluid?

I am surprised that nobody has mentioned the use of this product intradermally. I wonder why, and whether any experience has been had with it.

DR. WRIGHT: I hope Dr. Dorset was in the room when I explained that my only connection with this johnin has been in the testing of it, and I want to give full credit to Mr. Glenn, of our laboratory, who grew the product, and succeeded in getting such a luxuriant growth which made possible a real johnin that will give specific reactions.

Now as to the question as to what the doses were that we used, or how much johnin they represent in comparison with tuberculin, I can say only that by the method of preparation, the 5-cc dose we used is equivalent to 5 cc of the original culture fluid, plus the material we were able to extract from the organisms that grew in that culture medium. In other words, we started with 200 cc of culture medium, a good deal of which evaporates in the incubator. The organisms are separated, plasmolyzed with ether and extracted with water, using enough water so that when we add the water extract back to what was left of the 200 cc of culture medium, we have a final volume of 200 cc. Therefore, 5 cc of the finished johnin represents the substances in the culture medium plus what was extracted by water from the organisms without exposure to heat. I do not know any way to state any more definitely what it corresponds to.

About the intradermal use of johnin. M'Fadyean has reported on the use of johnin intradermally. I was not concerned in this testing with using it intradermally because I wanted to determine the reliability of this johnin in a temperature reaction. It is known that johnin will, in some instances, produce an intradermal reaction; I believe the reaction takes place a little sooner and oftentimes subsides a little sooner than does the intradermal tuberculin reaction. Personally, as a starter, I like the temperature reaction because you have a definite record to judge by that is not simply the opinion of an individual as to the size of the swelling or whether he thinks it constitutes a reaction, or whether it is a false reaction. In applying the temperature

test, although it is more work, you have an actual record that someone else can pass on, the same as you can pass on it yourself.

DR. A. S. SCHLINGMAN: In cases of doubtful reaction, are any symptoms of general reaction shown at all, and is there a specific length of time that must elapse before a retest can be made? Will one injection of johnin desensitize, as in tuberculosis?

DR. WRIGHT: As to whether an injection of johnin desensitizes the animal, we do not know how short a period can elapse before repeating the test, but we showed typical temperature reactions obtained within two months after the original test, and I think Dr. Turner mentioned some, if I remember rightly, at about two and one-half months. We have not made any at a shorter interval, but I do not suppose there is any reason to believe that it is materially different from the tuberculin reaction. We know in two months you may get apparently as good a reaction as you got in the first place. If Dr. Cain, who actually made the tests, is here I think it would be better for him to say whether he noticed any doubtful reactions. Apparently in testing cattle with johnin, whether you get a physical reaction or not, is not necessarily an index as to the severity of infection of the animal, any more than a reaction to tuberculin is an index of the extent of the tuberculous process. In the same way, apparently, the rise in temperature can not be directly attributed to the severity or lack of severity of the disease.

DR. C. B. CAIN: In the first test, of some eleven cattle, we went down the line and marked up what we considered the physical reaction to the test at that time. We simply marked those on the charts. We found only about six or seven, I believe, and that information is on the charts and I can not say whether it was suspicious or positive; in most cases they were positive. I do not know the proportion, but we were surprised at the physical reaction we got in mature cattle. In the younger cattle we got severe physical reactions in practically all the calves under a year old.

DR. W. A. HAGAN: Like Dr. Dorset, I feel like congratulating these men at Mulford's on the excellent growth of John's bacillus they have been able to obtain. I have been cultivating this organism, trying to produce a potent johnin, about two years, and while I have in one or two instances obtained growths like this, or not so good, I have not been able to reproduce this result consistently. The medium is made in exactly the same way, as far as I can tell, but after a fairly good lot the next lot will loaf along and run into months and form only a small membrane, and a scanty granular deposit on the bottom.

As Dr. Dorset pointed out, we can not hope to obtain a reliable product if we can not get more growth than this. So, for the last six months or a little longer, I have been attempting to produce johnin from organisms grown on solid media. I have experienced no difficulty at all in getting the organisms to grow on a solid medium. They grow readily enough; and neither have I experienced any particular difficulty in obtaining a new culture from clinical cases and even from feces. But in trying to get a vigorous growth on a fluid medium, in order to produce a potent johnin, I have become discouraged, so I am glad to see what these men have accomplished. I think I will go back and try again.

A potent johnin, in my opinion, is an excellent diagnostic substance. I have used the johnin produced by these men and obtained excellent results. I think that the results have been consistent in giving good, positive reactions on cows infected, and so far I have not seen any positive reactions on any that were not. My work has been done on several naturally infected herds, ranging from about 15 to 20 animals, but most largely, however, on a small group of animals which we have been assembling in the last year for studying the disease.

Some of the questions which have been asked this morning, I think I may be able to answer in part from some of these observations.

Now as to the clinical manifestation, after the injection of johnin, I have seen the manifestations which have been referred to. The animals will sometimes scour, they will frequently urinate at short intervals. I have not seen the scouring, but I have seen the urination and the dyspnea and anaphylactic-like reactions, in animals which were not infected with John's disease and



which had not been in contact with infected animals. I have seen similar symptoms in animals infected with Johne's disease, and my impression is that, in part at least, they are non-specific reactions. Now, when we inject considerable quantities of foreign material intravenously, it seems to me we must expect such things as these reactions which come on in a half-hour and pass off within the first hour.

I have not been particularly careful to warm the fluid to body temperature. I do not know whether they have or not. I have not injected it ice cold, but some of it, I know, has been considerably below the body temperature and possibly this may have something to do with this type of reaction.

I am wondering as to some of the details of the technic of carrying out the tests. Now, when the material is injected intravenously, as Dr. Wright has shown, the reactions go up and come down so quickly we do not dare allow the intervals to be longer than about one hour, because in many cases we would lose the peak, we would lose the clear-cut reaction, if we were to take longer intervals. Now in taking temperatures every hour, the animals must, of course, be very closely confined, and the question of watering the animals comes in then. If we give them water when the reaction curve is coming up, it may check it. If we have drinking-cups, of course, that obviates the difficulty, but sometimes we are not fortunate enough to have these drinking-cups and, if the animals are given access to water, it may spoil the curve.

We know, too, that toward the afternoon the temperatures of many of the animals will begin creeping up. Now, if we take temperatures every hour, the most convenient way is to begin in the morning, and take temperatures through the twelve hours of the day. In this way, by the sixth to eighth hours after injection, we are reaching the time when the temperatures of the animals will sometimes normally go one or two degrees higher than their earlier temperatures. So I would like to ask these men just how they conducted these tests. I wonder if that may not have something to do with many of the increases in temperature.

As to repeated tests, about one year ago I fed some animals with infected intestines of cases of Johne's disease. These animals were fed on several occasions with the intestines of two different animals. They have not, up to the present time, shown a single symptom of Johne's disease. I began, about two months after the feeding, giving them the johnin test, and two of three cows reacted then, and have reacted consistently on five subsequent tests since February. Now these tests have been given at various intervals, mostly with johnin of my own manufacture, but some with Dr. Wright's. They have always reacted. The third animal and several controls have never reacted. The results are perfectly clear cut all the way through. The temperature curves I think in all cases have reached very close to, if not more than 105°, and on several occasions they have approached 107°. Two of these tests, using johnin of my own manufacture, both intravenously, were done at ten-day intervals. The second test was just as sharp and clear cut as the first. There was no question about the reaction.

I have also tried, to a limited extent, the use of johnin subcutaneously. I ought not to say much, because I have not done enough of this. The use of the material intravenously is objectionable, it seems to me. Many veterinarians do not like to make an intravenous injection. The cattle-owners frequently do not like to see an intravenous injection made, especially in animals producing highly, and in delicate breeds, such as Jerseys, and it seems to me it would be desirable if we could use one of the other tests. And so I have tried the subcutaneous method. I have obtained by that method reactions very similar to those given by the intravenous injection, except that the reaction is later. The reactions have come on from the eighth up to the twelfth hour. The curve has been practically as good as the other, and they recede but rather slowly. The following morning the temperatures have sometimes not yet reached the level at which they began. The intradermal method—I have not used on cattle, but at the time of infecting the cattle last year I infected some sheep. That is to say, I fed some material to sheep. I do not know whether I infected them or not. Four animals received this material. These animals have reacted consistently and violently.

I know now that my doses of johnin were too great. I did not know it in the beginning. In the first test two of the infected animals died during the reaction. They showed violent physical reactions and subsequently died the following day and great hemorrhages were found in the fourth stomach and in the duodenum. These animals had been fed infective material only four months previously. We spent most of one day and a good share of one night trying to find out whether those animals were infected or not, and I want to point out here that John's disease is a very difficult disease to diagnose with physical and even bacteriological methods in its incipient stages. We did not succeed, after examining close to 100 specimens from various parts of the intestinal tracts and lymph-glands, in finding a single John's organism that we could definitely identify. Those animals had been definitely exposed to infection, and I feel from the reactions they were infected even though we could not confirm the results later at autopsy.

I have tried, recently, the intradermal reaction on these sheep—I had not gotten around to the cattle so far—and they gave beautiful intradermal reactions. There is an immediate swelling after the injection, even when johnin is injected subcutaneously, at least with the product I have been preparing. The following day there was a sort of flabby swelling. By the second day the swellings were very firm and hot. I called them 4x reactions, and one, I think, was a 6x reaction, according to the old nomenclature of recording intradermal tuberculin reactions. The control animals, by the second day, 48 hours, showed nothing.

Regarding the finding of the organism in scrapings of the intestinal mucosa and by feces examination, I have had no success at all in feces examination. One may occasionally be able to make a positive diagnosis, but there are too many other acid-fast organisms in the feces of cattle in order for one to be certain. Of course, the other acid-fast organisms are larger or thicker, so one can eliminate most of them, but we have seen some in normal cattle so nearly like the John's bacillus we do not feel sure in differentiating them.

Now, the rectal scrapings are a different matter, because the John's bacillus forms in clumps or masses, and frequently one can find the organism in great masses and clumps, and thus may make a reliable diagnosis. The method is a very uncertain one, however. The disease does not always affect the rectum, and in cases where it does, it does not affect the rectum uniformly. I had occasion in one case to take one square inch of the intestine where it was thickened, and eight different smears were made from this, and I think five of them showed the organisms and three did not. The organism is not uniformly scattered, and one single scraping or pinching may or may not tell the story. If it is positive, all well and good; if it is not, you can draw no conclusions therefrom.

MEMBER: What concentration was used for this intradermic injection?

DR. HAGAN: The johnin I used intradermally was concentrated to 40 per cent of the original volume. As to the original concentration, my johnin has been made on solid culture media because my original materials were too weak. I have no definite standard there, so the concentration I mention really has nothing more than a comparative value.

DR. JOHN REICHEL: I would like to comment further on the preparation of the johnin by saying that, from the work so far, most of the protein substances are in the liquid portion and very little is obtained by extracting the organisms themselves. All of the protein is therefore made by the organism. Most of the early work, when intravenous injections were made, were frequently followed by anaphylactic-like reactions, which probably were caused by proteins other than those specific of the John's bacillus.

DR. WRIGHT: I would like to say one thing about those physical reactions in the animals tested, along with Dr. Turner. We were particular to warm the johnin. Personally, I think it makes a decided difference. I do not mean if it is somewhere near body temperature, but take a real cold substance and inject it intravenously and you are apt to get some striking reactions. Particularly in this certified herd mentioned, I examined those animals very closely, because I was very much interested to see whether I could detect any physical reaction, or whether anybody with me could detect anything

abnormal. We could not see that anything happened to any of those animals in the slightest, except the one I mentioned that later got an increased diarrhea at the same time as the temperature reaction. But as far as seeing any reaction after the intravenous injection of 5 cc and even 10 cc, there was none. Theoretically I do not see why you should expect to see such a reaction if you are using a substance that has as its only protein matter a specific one produced by the organism. If the animal is not infected, I do not think you should expect to get a physical reaction. There is not enough concentration to do it. Anyway, the facts are that in the normal animals I have tested I have not seen it.

DR. TURNER: I am very careful to use warmed materials for all jugular injections. I am quite a believer in having this work done intravenously for the reason that it remains more strictly a veterinary problem.

Now, Dr. Hagan made the remark that the owner does not care to have the jugular vein tapped. This is done for some diseases and the owner should be willing to have it done in John's disease work. The longer we keep this work in the hands of careful veterinarians the better results we will have.

We are very careful in watering. The weather was cold when these animals were tested and they had been in the barnyard all night. We brought them into the barn early in the morning before starting the test and they received water at no time during the test. I do not know whether any of the other men have noticed this physical reaction that we observed as it was noticed over the rear of the animal, in the croup region and as far forward as the flank. There was increased respiration and not much twitching of the muscles over the neck and shoulders as contrasted with marked twitching of the croup muscles. Most of this twitching occurred during the second to the fourth hours after injection. We repeated these tests in a period of slightly more than two months, on the same animals, and found no difference in their temperatures, and practically the same degrees of reactions.

CHAIRMAN RAFNEL: I might throw a little light on Dr. Hagan's question as to the technic of this test, in the large herd that Dr. Wright spoke of. I happened to be one of the veterinarians conducting that test, but we had three veterinarians and several students who assisted us in placing the thermometers and taking them out, and handing them to the veterinarians to read. Now, we began at seven o'clock in the morning. I think the cattle had been in the stable all night. At seven o'clock in the morning we began taking the temperatures and took them at two-hour intervals until eleven o'clock, and after the eleven o'clock temperature had been taken the cattle were turned out for water. We divided this herd of 207 into two groups, and the group we were not working on were in the pasture at the time. The cattle were watered at about eleven, and we began our injections at one o'clock. We divided our veterinarians so that while some of us were making the injections, others were taking temperatures as soon as the hour was up on the first animal injected. We had enough veterinarians to keep ahead of the temperature men, so we completed our injections so the temperatures came along at hourly intervals and we all dropped back to taking temperatures.

In reference to the subcutaneous injection, I believe we had six bulls connected with this herd. We handled the bulls on the second day, as we were rather tired. It takes, as you know, most all day and all night. We ran these temperatures, by the way, from one o'clock until two. But on these bulls, we were unable to make an intravenous injection, at least the veterinarians, after wrestling the bulls around, got tired and decided to make subcutaneous injections on the bulls, and we continued these temperatures then. They were injected at approximately one o'clock, and these temperatures continued until four o'clock the following morning, and we had no reaction among the bulls. Now, whether or not that was due to the fact it was a subcutaneous injection, or they were not infected, we do not know. The bulls are kept entirely isolated from the herd proper, coming in contact only when used for breeding.

DR. HAGAN: Answering Dr. Reichel, the johnin I have been making is not made from the organisms alone. I have used a solid medium and have extracted the medium later. The organisms presumably form johnin and

other soluble products on this medium as well as on a fluid medium. I cover the surface of the medium with distilled water, extract, and use the extract produced. Obviously, several materials are extracted from the medium, certainly much foreign matter is extracted and the material after extraction has a distinct tuberculin odor. So it is not simply an extract of the organisms themselves. The anaphylactic-like reactions may be due to some of the constituents in the culture medium. At any rate I see very little specificity in it. Some of them may be because I have failed to heat the johnin to body temperature. As I have said, I have not used icy cold injections. In some cases I have heated it, but in most cases I have used it merely at the temperature carried, which is approximately room temperature, somewhat lower than the body. The reactions as I have seen them, however, are not at all serious, and I simply wanted to warn that such reactions should not be interpreted as specific.

### EXAMINATION FOR JUNIOR VETERINARIAN

The United States Civil Service Commission announces an open competitive examination for junior veterinarian to fill vacancies in the Bureau of Animal Industry, Department of Agriculture, for duty in the field, and in positions requiring similar qualifications. The entrance salary is \$1,860 a year. A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions.

Announcement is made of an important change in the qualifications for entrance to this examination, under the paragraph relating to age. The maximum age limit for participants in the examination is now forty-eight years instead of forty-five.

Applicants must have been graduated from a veterinary college of recognized standing, or must be senior students in such an institution and furnish proof of graduation during the existence of the eligible register resulting from this examination; provided, that the names of senior students who pass the examination will not be certified for appointment until they have furnished proof of actual graduation.

Competitors will be rated on veterinary anatomy and physiology, veterinary pathology and meat inspection, and the theory and practice of veterinary medicine.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the United States civil service board of examiners at the post office or customhouse in any city.

Applications must be on file not later than April 28, 1928. The examinations will be held about ten days later. Applicants will be notified of the exact date.

## RESULTS OBTAINED BY THE USE OF JOHNIN IN CATTLE\*

By HENRY W. TURNER, Harrisburg, Pa.

*Pennsylvania Bureau of Animal Industry*

In this report we present the results obtained with the use of johnin in forty-two animals in four herds. The johnin used (lots IV and VI) was prepared by the H. K. Mulford Company.

*Group I:* The infection in this herd was first called to our attention, December 26, 1925, by Dr. George Smith, who at that time sent rectal scrapings to the laboratory of the Pennsylvania Bureau of Animal Industry. His letter indicated the herd had been affected with periodic and more or less persistent diarrhea for some time and at least eight animals had died. In describing these cases he gave a typical picture of John's disease. The result of laboratory examination of the rectal scrapings showed acid-fast bacilli, typical of those found in John's disease. The trouble continued in this herd and on January 5, 1927, the johnin test was applied. At this time there were eighteen animals in the herd. All animals were tested except three, which were less than four months of age. A retest of this herd was made on March 24, 1927. All the animals were included in this test. The owner's belief was that the herd had been infected for a period of four years.

*Technic of the test:* The animals were stabled a few hours prior to the test and temperatures taken at the second and first hours prior to the time of injecting the johnin. A 10-cc syringe was used with a 15-gauge slip-needle. These were carefully sterilized before being used. The skin at the point of injection was cleansed and disinfected and the needle inserted into the jugular vein. Before making the injection there was a good flow of blood, assuring the operator that the needle was in the lumen of the vein. The bottles containing the johnin were placed in warm water and the temperature of the johnin when injected was about body temperature of the animals. No feed or water was given the animals during the tests. Post-injection temperatures were taken at hourly intervals until the fifth hour, then every two hours until at least the eleventh hour after

\*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.



CHART I—*Johnin tests of suspicious animals in herd in which laboratory diagnosis of John's disease had previously been made*

CHART I— <i>Johnin</i> tests of suspicious animals in herd in which laboratory diagnosis was made																					
NUMBER OF ANIMAL	AGE	TEST	PRE-INJECTION TEMPERATURES (HOURS)		JOHNIN (CC)	POST-INJECTION TEMPERATURES (HOURS)											RESULTS				
			2	1		1	2	3	4	6	8	10	11	TEST	POST-MORTEM	LAB. FIND.					
3	1½ yrs.	Orig. Retest	3.0	2.8 2.8	7.0 5.0	3.0 4.0	3.0 4.6	4.2 5.0	4.3 4.4	3.6 3.0	2.8 2.0	3.0 3.0	2.0 —	Neg. Pos.	N.V.L.	Neg.	Dam died, 1926. John's disease				
*4	10 yrs.	Orig. Retest	0.4	1.4 2.0	10.0 5.0	2.6 2.6	3.4 3.0	4.0 3.6	4.0 3.8	4.3 4.2	2.2 2.0	2.2 —	Sus. Sus.	N.V.L.	Neg.						
5	2 yrs.	Orig. Retest	3.0	3.0 2.2	10.0 5.0	3.0 3.4	5.0 6.2	5.8 5.4	6.0 6.4	5.2 5.8	4.2 4.8	2.3 —	Pos. Pos.	N.V.L.	Pos.		Dam died, John's disease. Physical reaction 2nd hr.				
6	1½ yrs.	Orig. Retest	3.4	3.2 3.6	10.0 5.0	4.0 3.6	5.8 4.8	6.5 5.0	5.3 6.5	4.3 6.4	3.8 2.3	2.2 —	Pos. Pos.	N.V.L.	Neg.		Dam died, John's disease. Physical reaction 3rd hr.				
*7	8 yrs.	Orig. Retest	1.0	0.8 2.2	10.0 5.0	1.6 2.2	2.2 2.4	2.2 2.0	2.2 2.2	2.1 2.0	1.0 1.0	0.6 —	Neg. Neg.	N.V.L.	Neg.		Majority of cow's calves have been affected.				
†8	1 yr.	Orig. Retest	2.6	1.6 2.0	5.0 4.0	2.4 2.0	4.2 3.8	4.8 4.6	4.0 4.4	3.6 4.3	2.8 2.3	3.0 —	Pos. Pos.				Dam No. 7—Neg. At owner's farm				
*9	1 yr.	Orig. Retest	2.6	2.4 2.8	5.0 4.0	2.0 3.4	3.8 4.0	4.2 4.4	3.6 6.5	3.2 5.0	4.1 4.3	1.8 3.2	Sus. Pos.				Dam died. Physical reaction 2nd hr. At Exp. Farm for observation				
*10	6 yrs.	Orig. Retest	0.4	1.2 2.4	10.0 5.0	1.8 2.4	3.0 3.0	5.6 3.4	6.8 2.5	2.4 5.0	4.0 3.6	2.2 3.0	2.2 —	Pos. Pos.			Dam a reactor. Physical reaction 3rd hr. At Exp. Farm for observation				



†11	1 yr.	Orig. Retest	3.4	2.0 2.2	5.0 3.0	3.0 3.0	3.6 3.8	4.0 5.0	4.0 4.8	0.3 1.8	0.3 4.8	2.2 2.4	2.4 3.0	Sus. Pos.			Dam affected. At owner's farm
†12	1 yr.	Orig. Retest	1.6	2.2 2.6	5.0 3.0	2.4 3.0	4.6 4.2	2.4 0.5	2.1 2.5	1.2 2.3	0.1 2.3	1.4 2.2	1.6 2.2	Sus. Pos.			Dam a reactor. At owner's farm
*13	4 mos.	Orig.	—	2.0	3.0	1.4	2.6	3.2	2.4	3.8	2.8	2.0	—	Sus.			Dam negative. At Exp. Farm for observation
*14	1 yr.	Orig. Retest	2.0	1.8 3.0	5.0 3.0	1.8 3.0	3.6 4.2	5.0 5.6	0.5 0.3	0.4 6.2	0.2 2.8	2.4 —	2.2 —	Pos. Pos.	N.V.L.	Pos.	Dam reactor with physical symptoms
15	12 yrs.	Orig.	1.2	1.6	12.0	2.2	4.4	5.0	4.0	2.2	1.4	1.2	Pos.	Pos.	Lesions		Violent physical reaction ½ hr. after injection
*1	4 mos.	Orig.	—	1.0	4.0	1.8	2.2	8.4	2.5	0.3	0.2	6	—	Pos.			Dam a reactor. Physical reaction 4th hr. At Exp. Farm for observation
*2	4 mos.	Orig.	—	99.8	4.0	99.8	99.8	1.6	3.6	5.6	3.4	1.4	—	Pos.			Dam suspicious. At Exp. Farm for observation
16	2 yrs.	Orig.	1.8	1.6	10.0	1.8	3.0	2.6	3.0	2.0	1.6	1.2	1.2	Neg.	None	None	
17	2 yrs.	Orig.	2.0	1.8	10.0	1.6	4.0	4.4	4.3	4.2	4.2	2.2	2.2	Pos.	None	None	
18	2 yrs.	Orig.	3.8	2.0	10.0	2.2	3.4	4.4	5.6	5.0	2.1	1.8	1.6	Pos.	None	None	

NOTE: The original test in this herd was made January 5, 1927, with lot IV Johnin (Mulford). The retest was made March 24, with lot VI Johnin (Mulford).

\*Animals purchased by Pennsylvania Bureau of Animal Industry Experiment Farm.

†Animals still remaining on the owner's farms where the tests were made.

injection. Results of tests were indicated by P (positive) and N (negative).

#### EXPLANATORY NOTES. CHART I

The first animal on chart I (cow 3) was negative to the original test, but gave a positive reaction to the retest. On post-mortem there were no visible lesions. Some of the viscera of this animal were sent to the laboratory for examination. The laboratory findings were negative.

Cow 4 was a suspect, on both tests. It was purchased and slaughtered by the Bureau for the purpose of postmortem and laboratory examinations. Both were negative for Johne's disease.

Cow 5 gave a very typical reaction to both tests. Showed good physical reaction to the retest at the second hour after injection. Postmortem: no visible lesions. Laboratory findings: positive.

Cow 6 was positive to both tests. Postmortem: no visible lesions. Some of the viscera of this animal were submitted to the laboratory for examination. Laboratory findings: negative.

Cow 7 was negative to both tests. Purchased by the Bureau and slaughtered for postmortem and laboratory examinations, which were negative.

Cow 8 reacted to both tests. Still on the owner's farm.

Cow 9 was suspicious to the original test and positive to retest.

Cow 10 was positive to both tests. Cows 9 and 10 are at the Pennsylvania Bureau of Animal Industry Experiment Farm for observation.

Cow 11 was a suspect on our original test and a reactor to the retest. Not slaughtered; at owner's farm.

Cow 12 was a suspect to the original test. The second hour after injection this animal gave a rise of more than two degrees in temperature, but this temperature dropped so suddenly that we did not think it best to call her a reactor, as we were going to retest the herd. She was positive to the retest. Still on the owner's farm.

Cow 13 was a suspect. On Bureau Experiment Farm for observation.

Cow 14 was positive to both tests. Postmortem: no visible lesions. Laboratory findings: positive.

Cow 15 was the only physically affected animal in the herd. She was given 12 cc of johnin, which caused such a reaction

CHART II—*Johnnin tests of suspicious animals in herd in which no diagnosis of Johne's disease had previously been made*

NUMBER OF ANIMAL	AGE	TEST	PRE-INJECTION TEMPERATURES (HOURS)		JOHNNIN (CC)	POST-INJECTION TEMPERATURES (HOURS)										RESULTS		
			2	1		1	2	3	4	5	7	9	11	TEST	POST- MORTEM	LAB. FIND.		
1	6 yrs.	Orig. Retest	1.2 1.2	1.6 1.0	10.0 10.0	2.2 2.1	1.8 2.1	2.3 2.8	3.6 3.8	3.6 3.6	2.4 3.2	1.6 2.1	1.2 1.2	Neg. Sus.	N.V.L.	Neg.		
*2	4 yrs.	Orig. Retest	1.8 1.6	1.6 2.3	10.0 10.0	2.6 3.2	3.3 3.2	3.4 3.7	3.2 3.4	2.8 2.4	2.8 2.4	2.6 1.8	1.8 1.8	Neg. Neg.				
*3	3 mos.	Orig. Retest	2.0 2.0	2.0 2.2	3.5 3.0	2.4 3.0	2.9 3.4	2.9 2.9	3.9 3.8	3.4 3.2	2.8 2.9	2.2 2.7	2.4 2.7	Neg.				

\*Animals purchased by Pennsylvania Bureau of Animal Industry Experiment Farm and held there for observation.

CHART IV—*Johnnin test of tuberculosis-free cow showing suspicious diarrhea*

COW	AGE (YRS.)	TEST	PRE-INJECTION TEMPERATURES (HOURS)		JOHNNIN (CC)	POST-INJECTION TEMPERATURES (HOURS)										RESULTS		
			2	1		1	2	3	4	5	7	9	11	TEST	POST- MORTEM	LAB. FIND.		
1	3	Orig.	2.6	2.4	5.0	1.5	2.0	2.4	2.1	1.9	1.8	2.1	1.6	Neg.				

that she dropped to the ground a short time after injection. Her muscles twitched violently; her breathing was short and quick. These symptoms, except the muscular twitching, soon disappeared and she returned to her feet. All during the test there was an increased diarrhea. Slaughtered. Postmortem: macroscopic lesions. Laboratory findings: positive.

Calves 1 and 2 were only four months old at the time of the first test and were not tested. On the retest they were injected. Both gave a reaction and are being held at the Bureau Experiment Farm for observation.

Cow 16 was negative to the original test. Slaughtered prior to retest and no postmortem held.

Cows 17 and 18 were positive to the original test. Slaughtered prior to retest and no postmortem held.

*Group II:* This group consisted of two animals from a herd of seventy-three. To our knowledge no diagnosis of Johne's disease had ever been established. The herd was also free from tuberculosis. These two animals were suspected on account of a more or less persistent diarrhea. They were removed from the premises and placed in segregation, January 15, 1926, at the Bureau Experiment Farm, where they were kept under observation for a period of more than one year. Occasional studies of the feces were made to determine the presence or absence of Johne's bacillus, but each time with negative results. The physical condition of these animals has always been good. They have never shown any symptoms of Johne's disease. One of these cows gave birth to a bull calf, which was allowed to run with them. Johnin tests were applied to these two cows and calf, January 11, 1927, and March 30, 1927. The results are shown in chart II.

#### EXPLANATORY NOTES. CHART II

All of the animals in chart II gave a rise in temperature after the injection of johnin. While we were not satisfied with the results of the test, we decided to slaughter cow 1. A very careful postmortem was made, but no lesions were found. The entire intestinal viscera were sent to the laboratory for examination. The laboratory report was negative. The other cow and the calf are still running together and are in good physical condition.

*Group III:* This group consisted of twenty cattle maintained in a tuberculosis-infected herd of forty-five animals, with no

CHART III—*Johnnin test of tuberculosis-infected herd*

Cow	AGE YRS.	PRE-INJECTION TEMPERATURES (HRS.)		JOHNNIN (CC)	POST-INJECTION TEMPERATURES (HOURS)								TEST	POSTMORTEM
		2	1		1	2	3	5	7	9	12			
1	12	2.0	1.6	10.0	1.4	2.2	2.9	2.0	1.8	1.4		Neg.	Lesions Generalized	
2	9	2.0	1.6	10.0	1.8	2.1	2.1	2.0	1.4	1.2		Neg.		
3	10	1.4	2.0	10.0	1.6	2.6	1.9	2.4	1.7	1.4		Neg.		
4	9	1.8	1.6	10.0	1.2	1.7	1.8	1.8	1.5	1.7		Neg.	Lesions Generalized T. B.	
5	10	2.0	1.0	5.0	1.6	1.8	1.7	1.5	1.4	1.4		Neg.		
6	9	1.8	1.7	5.0	1.6	1.6	1.8	1.6	1.8	1.2		Neg.		
*7	12	1.7	1.7	5.0	2.4	4.0	3.7	1.8	1.4	0.6		Pos.?	Lesions Generalized T. B.	
8	13	1.2	1.2	5.0	1.4	2.2	2.0	1.6	1.4	0.8		Neg.		
9	11	2.0	2.3	3.0	1.4	1.4	2.0	1.4	1.0	1.8		Neg.		
10	12	1.9	1.8	3.0	1.6	1.4	1.6	1.5	1.8	0.6		Neg.	Lesions T. B. lesions	
11	7	1.7	2.4	3.0	1.4	1.6	0.6	1.7	1.7	1.4		Neg.		
12	12	2.6	2.0	3.0	2.2	2.2	2.0	2.1	2.1	1.6		Neg.		
13	13	1.0	1.2	5.0	1.2	1.0	1.2	1.3	1.4	1.0		Neg.	Lesions	
14	14	2.0	2.0	5.0	2.0	2.9	2.2	2.0	1.8	1.6		Neg.		
15	10	1.6	1.2	3.0	1.0	1.2	1.6	1.6	1.5	1.0		Neg.		
16	12	2.5	1.6	3.0	1.9	1.6	2.0	1.8	1.6	1.2		Neg.	Generalized T. B. Lesions	
*17	18	1.8	1.4	10.0	1.4	1.8	2.6	3.7	4.7	4.2	2.4	Pos.?		
18	12	1.6	1.6	10.0	1.2	1.0	1.0	1.2	1.8	0.6	1.8	Neg.		
19	14	2.0	1.4	5.0	1.6	1.4	1.4	2.0	2.0	1.4	2.0	Neg.	Lesions Generalized	
20	11	2.4	2.4	5.0	1.8	2.2	2.0	2.0	2.0	1.6	2.6	Neg.		

\*Animals purchased by Pennsylvania Bureau of Animal Industry Experiment Farm.

history of Johne's disease. The purpose of this test was to see if tuberculosis-infected animals would react to johnin. The results are shown in chart III.

#### EXPLANATORY NOTES. CHART III

The first sixteen animals shown in chart III were injected intravenously. The last four were injected subcutaneously. There were but two animals (7 and 17) that showed any elevation of temperature. Cow 7 showed a rise at the second hour after injection, and a decided rise at the eighteenth hour. Her temperature at this time was 106.4°. She was slaughtered within a few days and postmortem showed generalized tuberculosis, but negative to Johne's disease. Cow 17 was one of the animals that received the johnin subcutaneously. She showed a decided rise in temperature at the seventh hour after injection. She also was slaughtered a few days after the test and postmortem showed generalized tuberculosis and negative to Johne's disease. In our opinion, these elevations of temperature might have been due to the physical condition of the animals, since each case showed advanced tuberculosis with an extensive involvement of the pleura. This belief is further supported by the fact that one of these animals showed a high temperature on the eighteenth hour after injection.

Most of these animals have been slaughtered since the test and all have shown well-marked lesions of tuberculosis. None have shown any evidence of Johne's disease.

The above three groups account for forty-one of the forty-two animals tested. The forty-second animal was out of a herd of seventy-five tuberculosis-free animals. This animal was tested for the reason that she showed a diarrhea, which lasted for only one day. The owner suspected this animal because her dam was supposed to have died of Johne's disease. The results of this test are shown in chart IV.

#### CONCLUSIONS

1. Chart I would seem to indicate that the presence of Johne's disease can be detected by the use of johnin before a diagnosis can be made from laboratory examinations of rectal scrapings, or before visible lesions can be found.

2. It would also indicate that a diagnosis, by microscopic examinations, is not usually made until after the suspected animal shows advanced physical symptoms.



3. Physical conditions and findings of animals shown in chart II, and also the conditions on the farm from which these animals came, would indicate that the original suspicion of Johne's disease was not confirmed. If this suspicion was not correct, the chart would also indicate that a slight rise in temperature may follow the injection of johnnin in animals not affected by Johne's disease. Chart II also indicated that, with an interval of at least seventy-eight days between tests, one test has no noticeable effect upon the temperature rise in a subsequent test.

4. On the other hand, contrary to chart II, charts III and IV would indicate that, in animals not affected with Johne's disease, the injection of johnnin does not cause any post-injection temperature rise.

5. Chart III, with the exception of two animals, also indicates that animals free from Johne's disease, but affected with tuberculosis, do not show a temperature reaction to the johnnin test.

6. Inasmuch as tuberculosis and Johne's disease both indicate that the animal should be slaughtered, it makes little or no difference if animals affected with tuberculosis do react to the johnnin test, and vice versa.

### PUBLICATIONS RECEIVED

- Practical Methods in Handling Street Cases Involving Animals. Thomas F. Freel. Michigan Humane Society, Detroit, Mich. pp. 8. Illustrated.
- Poultry Diseases. E. L. Stubbs. (Gen. Bul. 453, Penns. Dept. of Agr., Harrisburg, Pa., Sept. 1, 1927. pp. 37. Illustrated.)
- Bovine Tuberculosis: Progress in Its Eradication. (Cir. 131, N. J. Dept. of Agr., Trenton, N. J., November, 1927. pp. 83.)
- Nodular Lesions in the Spleen of Swine Caused by Actinomyces Infection. G. T. Creech, Washington, D. C. Reprint from *Jour. Agr. Res.*, xxxv (1927), 9, pp. 835-841. Illustrated.
- Standard Milk Control Code. U. S. Public Health Service, Washington, D. C., 1927. pp. 102.
- Livestock Exhibits of the United States Department of Agriculture at the Twenty-Eighth International Live Stock Exposition, Chicago, Ill., November 26 to December 3, 1927. pp. 32.
- Maryland, Eleventh Annual Report of the Hog Cholera Work in. Maryland State Board of Agriculture, College Park, Md., 1927. pp. 5.
- Fowl Typhoid. C. C. Palmer and H. R. Baker. (Bul. 153, Univ. Del. Agr. Exp. Sta., Newark, Del., January, 1928. pp. 14.)
- Horses-Mules Power-Profit. (Leaflet 190, Horse Association of America, Chicago, Ill., 1928. pp. 29. Illustrated.)
- The Germicidal Properties of the Mixture of Kerosene and Coconut Oil. Zacarias de Jesus, Los Banos, Laguna, P. I. Reprint from *Philippine Agriculturist*, xvi (1928), 9, pp. 521-529.
- Pennsylvania Bulletin, School of Veterinary Medicine Announcement, 1928-1929, University of. Philadelphia, Pa., 1928. pp. 48.

## A POSSIBLE CURE FOR JOHNE'S DISEASE\*

*By W. W. WILLIAMS, Springfield, Mass.*

During the course of gynecological practice amongst cattle, we frequently encounter cows which scour insidiously. From the gynecological viewpoint, they demand attention, owing to the deleterious effect upon their general constitution, which in turn interferes with reproduction. From time to time, I have had the opportunity of observing Johne's disease as the basis of this scouring. With the exception of one cow, a Brown Swiss, all cases have been of the Jersey breed.

My most recent encounter with this disease has been in a Jersey herd composed largely of imported animals. In the fall of 1926, two began scouring intermittently and, by the middle of December, it had become continuous. From the clinical behavior of the animals, they were plainly cases of Johne's disease, but for some reason, the attending veterinarian had not sensed this and had resorted to various dietetic changes, and medicinal treatments to prevent scouring. Then it happened that one or two animals of the herd developed hemorrhagic septicemia and assuming that the scouring was an intestinal form of this disease, anti-hemorrhagic septicemia serum was administered. These treatments in several instances improved the condition of the feces for the matter of a day or two, with scouring returning profusely at the end of this time.

The owner, although ready to acknowledge the presence of some disease other than a mere dietary scours, would not agree to having a test with johnin. On February 26, I made a rectal examination of each of the two affected animals. Both showed a thickening of the rectal walls, and in the instance of one of them, which I shall designate as case 2, this thickening was very marked. A microscopical examination of the rectal scrapings revealed an abundance of Johne's bacilli in case 2, but none could be found in the scrapings from the other animal (case 1).

About this time, another animal commenced scouring and was diagnosed from its clinical behavior as Johne's disease. The possibility of effecting a cure for this disease then arose, being suggested by certain group reactions pertaining to other infections. This is illustrated by the group immunity which can be conferred against various of the pathogenic strains of the Pasteur-

\*Presented at the sixty-fourth annual meeting of the American Veterinary Medical Association, Philadelphia, Pa., September 13-16, 1927.

ella group, and again it is illustrated by the special affinity that certain mercurial preparations exhibit towards protozoa.

The unsatisfactory treatment of diseases due to the acid-fast group of bacteria has generally been owing, in the first place, to the inability to find a reagent having a bactericidal action upon these organisms in their habitat in the tissues; and, secondly, as in the case of tuberculosis, to the walling-off of infections in such a manner that medicinal agents can not reasonably come into contact with the bacteria. A notable exception to this, however, exists in the case of leprosy, where the use of chaulmoogra oil has been instrumental in curing almost all cases of this disease in the Hawaiian Islands and bids well to eliminate this scourge from the face of the earth.

Owing to the similarity of the type of bacteria causing leprosy and Johne's disease, I was prompted to try chaulmoogra oil with the latter.

#### TREATMENT

Treatment was commenced, on the three cows mentioned, about June 10. One of these (case 1, whose general condition had been fairly good up until about this time) had ceased to eat several days before treatment commenced and died a week later. Case 2, an animal which had been greatly emaciated since early in the year and from which Johne's bacillus had been recovered, showed improvement in the condition of the feces in about three days. The feces appeared normal after one week and since then she has rapidly taken on flesh and increased in milk-production. She appeared perfectly healthy when observed on September 2 and there has been no recurrent scours.

With case 3, scouring ceased within two days after chaulmoogra oil was given. This animal had shown symptoms of the disease for only about three months.

The chaulmoogra oil was given in graded doses, starting with 1 cc daily and increasing gradually up to 5 cc. It has been continued with case 2 almost daily since June 10. With case 3, administration was discontinued after about one month.

In the instance of case 1, the animal that died, she had already ceased eating several days prior to the commencement of treatment and died quite naturally of starvation. Autopsy revealed a chronic inflammation and thickening of the rectal wall and, apparently, also the cecal walls were affected. A histological examination by Dr. C. M. Carpenter revealed a chronic catarrhal and productive inflammation, typical of Johne's disease. Acid-

fast organisms were not found, but inasmuch as it is often difficult to demonstrate them, even when the disease is known to be present, such failure may quite often be anticipated. The history, symptoms and lesions of the case, however, left no reasonable doubt as to the identify of the disease.

On account of the paucity of my observations, a report at this time may seem rather premature, and indeed it is too early to warrant any positive assertions on the merits of chaulmoogra oil in the cure of Johne's disease. I do feel, however, that my cases 2 and 3 make an otherwise unexplainable and unusual improvement and that chronologically this was associated with the medications.

I am reporting my experience in this matter in hopes that others, perhaps with more ample material at their disposal, may make more extended observations; and although personally feeling encouraged with the apparent benefit to the cows, I am awaiting the results of further observations over a longer period of time before considering chaulmoogra oil as more than a possible remedy or cure for Johne's disease or paratuberculosis.

#### DISCUSSION

MEMBER: How is the oil administered and what is the dose?

DR. WILLIAMS: Internally. It may be given pure or mixed with a neutral oil, such as olive oil or mineral oil. Administration was started with 1 cc and graded up to 5 cc. The probability is that the correct dose ranges somewhere between 5 and 10 cc daily; but with the smaller number of cases treated, there is insufficient basis for establishing dosage.

MEMBER: I would be interested in knowing just how chaulmoogra oil has any effect on the Johne bacillus, whereas it has none on the tubercle bacillus. I do not know how it acts through the intestines. Do you know anything about the absorption of the oil?

DR. WILLIAMS: I am not familiar with that.

MEMBER: There is a close similarity between the two organisms, and I asked that question because the oil has no effect on the tuberculosis organism.

DR. WILLIAMS: The tubercle bacillus produces a different pathological condition, in which if certain ingredients of the oil were in the blood-stream, we could not reasonably expect that contact with the tubercle bacillus would take place—in a majority of cases, anyway. I think the availability of the infection for the chemical action may be compared more with leprosy, that is, Johne's disease may be compared more with leprosy than with tuberculosis. My observations not having been very extensive, I can not answer the question as to how the oil may affect the bacteria. I would presume that the effect on the germ of leprosy resulted from some direct chemical action, but it may be due to an indirect action in which the tissues of the body play an important part.

DR. W. A. HAGAN: I would like to ask the speaker back there if he knows whether chaulmoogra oil affects the Johne bacillus. It has been shown there is very little effect upon the tubercle organism. There is on leprosy, but I did not understand whether you had the information it was affected by it.

MEMBER: I do not know. In leprosy it is usually injected subcutaneously, I believe. Dr. Williams' method is entirely new.

DR. WILLIAMS: I found it had been used to a considerable extent by the mouth and had given good results when so administered.

## CLINICAL AND CASE REPORT

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

### REPORT ON COW AFFECTED WITH JOHNE'S DISEASE EXHIBITED AT A. V. M. A. CLINIC

By J. ALLYN ROGERS, *Bryn Mawr, Pa.*

At the clinic held in conjunction with the Philadelphia meeting of the American Veterinary Medical Association last year, a cow showing clinical symptoms of Johne's disease was exhibited for demonstration purposes. This cow gave a typical reaction to a 5-cc dose of johnin, injected intravenously. The pre-injection temperatures were 101.2° and 101.1° F. The temperature at the time of injection was 101.0° F. Temperatures were taken beginning one-half hour after the injection of johnin and continued at increasing intervals up until the ninety-sixth hour, as follows:

<i>Time after injection (hours)</i>	<i>Temperature</i>
1/2	102.0° F.
1	103.1
1 1/2	103.2
2	103.6
3	104.0
5	105.2
6	105.1
24	103.2
48	103.0
72	102.0
96	101.0

The cow was destroyed, September 17, 1927. She was very much emaciated and had a watery diarrhea. Postmortem examination showed very little alteration in the mucous membranes. A few red areas appeared on the mucous membrane of the cecum, smears of which showed a very few acid-fast bacilli typical of Johne's disease. Sections of the cecum showed small numbers of acid-fast bacilli. The small intestine showed a cellular infiltration of the mucous membrane with some epithelioid cells. The mesenteric lymph-glands appeared normal grossly, but on section, microscopically, showed epithelioid cells, some few giant cells and many clumps of acid-fast bacilli. The postmortem report was made by Dr. E. L. Stubbs, in charge of the Pennsylvania Bureau of Animal Industry Laboratory. The johnin used was prepared by H. K. Mulford Company and was from lot IV, described by Dr. H. K. Wright in a paper presented at the meeting.

## ARMY VETERINARY SERVICE

### CHANGES RELATIVE TO VETERINARY OFFICERS

#### Regular Army

Each of the following-named officers of the Veterinary Corps is relieved from further assignment and duty at the Army Veterinary School, Army Medical Center, Washington, D. C., and from temporary duty at the Medical Field Service School, Carlisle Barracks, Pa., to take effect upon completion of his course of instruction at the Medical Field Service School, on or about May 31, 1928, and will then proceed to the station indicated after his name and report in person to the commanding officer for duty:

Major Clell B. Perkins, Fort Sam Houston, Texas.

Captain Charles O. Grace, Fort Clark, Texas.

Captain Floyd C. Sager, Fort Reno, Okla.

Captain Forest L. Holyeross, Fort Riley, Kans.

Captain Nathan M. Neate, Fort Bliss, Texas.

Captain Jack G. Fuller is relieved from further assignment and duty at the Army Veterinary School, Army Medical Center, Washington, D. C., and from temporary duty at the Medical Field Service School, Carlisle Barracks, Pa., to take effect upon completion of his course of instruction at the Medical Field Service School, on or about May 31, 1928, is then detailed, by direction of the President, at Cornell University, will proceed to Ithaca, New York, and report for duty accordingly. The name of Captain Fuller is placed on the detached officers' list, effective upon reporting at Cornell University.

The promotion of Major James R. Shand to the grade of lieutenant-colonel, as of December 11, 1927, is announced.

Captain William R. Wolfe, is relieved from assignment and duty at Fort Sam Houston, Texas, and will proceed at the proper time to Colorado Springs, Colo., on or about March 15, 1928, and report for duty with the remount purchasing and breeding headquarters.

Captain Frank M. Lee is relieved from assignment and duty at the remount purchasing and breeding headquarters, Colorado Springs, Colo., and will proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port on or about March 21, 1928, for New York City, and upon arrival will proceed to Fort Jay, N. Y., for duty.

The promotion of the following-named officers is announced:

Lt. Col. Wm. P. Hill to Colonel, February 4, 1928.

Second Lt. E. E. Hodgson to 1st Lieut., February 2, 1928.

Major George H. Koon is detailed, in addition to his other duties, as attending veterinarian, U. S. Disciplinary Barracks, Ft. Leavenworth, Ks.

Captain John R. Ludwigs is relieved from duty at Fort Lewis, Wash., and will proceed at the proper time to San Francisco, Calif., and sail on the transport scheduled to leave that port on or about April 24, 1928, for New York City, and will then proceed to Fort Monroe, Va., for duty.

#### Reserve Corps

##### *New Acceptances*

Hollinger, Harold J. . . . .	2nd Lt. . . . .	Grant, Mich.
Neer, Lester C. . . . .	2nd Lt. . . . .	274 Delaware Ave., Dayton, Ohio.
Weicksel, H. J. S. . . . .	1st Lt. . . . .	108 Commerce St., Lock Haven, Pa.
Reed, Paul H. . . . .	1st Lt. . . . .	1101 Westlake Ave., Seattle, Wash.
Hannemann, W. H. . . . .	2nd Lt. . . . .	2619 Everett Ave., Kansas City, Ks.
Hiett, Allen A. . . . .	2nd Lt. . . . .	311 11th St., Sioux City, Ia.
Nugent, Wm. Kemp. . . . .	2nd Lt. . . . .	3314 Powelton Ave., Philadelphia, Pa.
Grootes, M. . . . .	Capt. . . . .	209 N. Washington St., Twin Falls, Idaho.



Bowers, Joseph M.....1st Lt.....411 Lucerne St., Bellevue, Pa.

Klein, Louis A.....	Lt. Col.....	Appointment terminated, Jan. 7, 1928.
Jones, Frank E.....	Capt.....	Declined reappointment.
Kimball, V. G.....	Capt.....	Died.
Welch, Albert J.....	Capt.....	Failed to accept reappointment.
Shane, Charles M.....	1st Lt.....	Killed by train, 12-3-27.
Byler, Carlos Clifford.....	2nd Lt.....	Died.
Howard, Paul V.....	2nd Lt.....	Failed to accept reappointment.
Owen, Harry H.....	2nd Lt.....	Failed to accept reappointment.
Kaliher, Vernon M.....	2nd Lt.....	Declined reappointment.
Gordon, Wm. Dane.....	1st Lt.....	O. R. C. status terminated because of National Guard status.
Ikard, E. H.....	1st Lt.....	Appointment terminated, 2-15-28.
Hecklin, Oliver P.....	Capt.....	O. R. C. status terminated because of National Guard status.

The American Veterinary Medical Association annually offers two cash prizes for the best essays written on a subject selected by the Surgeon General's office. Colonel W. George Turner, Director, Veterinary Corps, U. S. Army, has announced that the subject selected for the 1928 contest is as follows:

"The Progress Made by Veterinary Science During the Last Two Decades, with Reference to Its Bearing on the Health of Army Personnel."

The closing date for the contest this year is June 1, 1928. All regularly enrolled students in veterinary colleges recognized by the A. V. M. A. are eligible to participate in this contest. All essays should be completed and mailed to the Office of the Surgeon General on or before the date named. First prize is \$50.00; second, \$25.00.

The following appreciation of Dr. W. G. Hollingworth, of Utica, N. Y., recently appeared in one of the Utica papers, over the signature, "Rambler."

Will Doctor Hollingworth please emerge from the camouflage of von columnar obstruction in this assembly chamber and approach the platform?

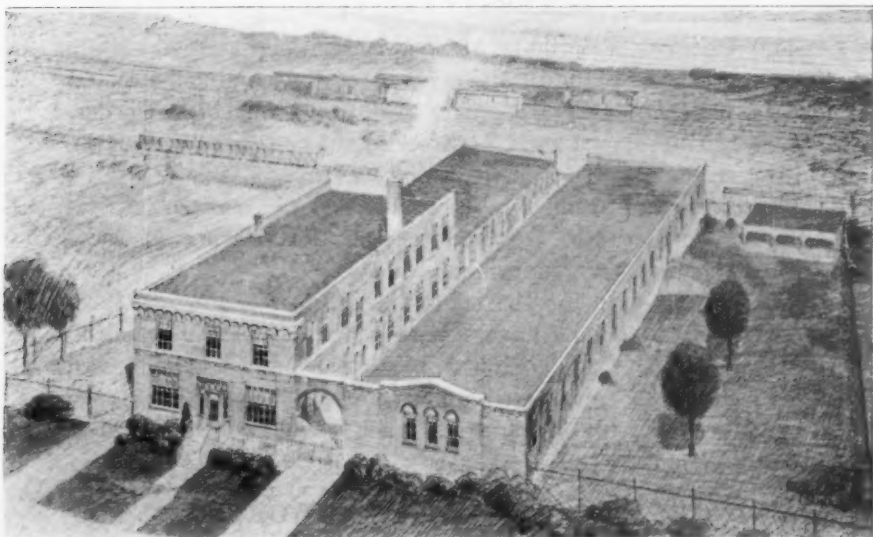
I have known you for long, Doc—half a century, and that you are one of the nobility among gentlemen of your calling and, well, plainly speaking, you prefer to let your good work speak for itself without any high-hat stuff from appreciative Uticans. Be that as it may, here's where you get what's coming to you, and has been for decades.

Your efficient method of safeguarding our health by your keen research of food served us should be worth a diamond-studded crown. But you're so dinged reticent, modest, as well as the quickest side-stepper in town when we want to pat you upon the back that one can't reach you with a ten-foot pole. God bless you, Doc!

## MISCELLANEOUS

### ASHE LOCKHART, INC.

The advertising section of this number of the JOURNAL contains an announcement of the establishment of a new biological laboratory for the production of veterinary biological products in Kansas City, Mo., to be operated under the name of Ashe Lockhart, Inc. The new plant is located at 800 Woodswether Road and is equipped to produce bacterins, vaccines, aggressins, antitoxins and other sera prepared from horses. A separate department is devoted to the production of homologous anti-canine distemper serum and canine distemper antigen. The



NEW LABORATORY OF ASHE LOCKHART, INC.

buildings are of fire-proof construction, being brick and concrete throughout. The products of the new company will be sold to graduate veterinarians only. Arrangements have already been made with a number of well-established firms throughout the country to handle the products of Ashe Lockhart, Inc.

The bacteriological work is in charge of Dr. John J. Glover, who, with Dr. Ashe Lockhart, devotes his entire time to operating the new laboratories. Friends of Dr. Lockhart will recall that he was formerly associated with the Kinsley Laboratories, at

Kansas City, both as a member of the firm and laboratory director for more than ten years. Prior to that connection, Dr. Lockhart was an instructor in the Kansas City Veterinary College and, before going to Kansas City, he was associate professor of animal husbandry at the Virginia Polytechnic Institute, Blacksburg, Va. The accompanying illustration gives some idea of the appearance of the new plant, which is located quite close to the business district of Kansas City, although in a neighborhood which has not been extensively developed until comparatively recently. Even with the growth that has taken place in the neighborhood, the plant is fairly well isolated.

---

### SOUTHERN KANSAS VETERINARY MEDICAL SOCIETY

On Monday, November 21, 1927, the veterinarians in the vicinity of Wichita met and formed a local veterinary society, known as the Southern Kansas Veterinary Medical Society. The officers elected were: Dr. H. E. Curry, president; Dr. L. E. Bruncher, vice-president; Dr. George A. Rathman, treasurer; Dr. L. E. Dietrich, secretary. The Society will hold quarterly meetings.

L. E. DIETRICH, *Secretary.*

---

### ERRATUM

In the article by Doyle, in the February issue, the word "typhoid" should read "typical," in the fourth line of the second paragraph, page 587.

---

### PLANS FOR MINNEAPOLIS

*The place:* Minneapolis, Minnesota.

*The time:* August 7-8-9-10, 1928.

*Headquarters:* New Nicollet Hotel.

*Official route:* Burlington-Great Northern.

---

### GENEROSITY

One of those quaint fillers that run around in the newspapers of the country, nestling at the bottom of the column, says that "big ears are signs of generosity." If any person doubts that statement, let him stand close to the heels of a mule. The mule will give him everything he's got.—*Detroit Free Press.*

## ASSOCIATION MEETINGS

---

### VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was held at the Academy of Medicine, 103rd St. & 5th Ave., New York City, Wednesday evening, January 4, 1928.

Dr. C. G. Rohrer, President, presided. Attendance—34. The minutes of the December meeting were read and approved.

The principal speaker for the evening was Dr. Edward Lodholz, of the University of Pennsylvania. He gave a talk on "Old Age in Domestic Animals; Its Nature and Control." Dr. Lodholz' very interesting paper showed points such as periods of cell growth of different tissues and the physiological factors producing old age, which are taking place during the span of life. His paper showed quite clearly that it is impossible to prevent old age. The number of questions taken up in the discussion showed that the paper was exceptionally interesting to the Association. A rising vote of thanks was extended Dr. Lodholz for his contribution to the program.

Dr. O. E. McKim reported a case of a convulsion produced in a dog by putting one drop of a 5 per cent solution of eserine in the eye. The prescription was compounded incorrectly.

The following men were elected to membership: Drs. Walter R. Miller, Donald A. Yandell and Warren F. Hogg, all of New York City.

The Association was sorry to hear of the death of Mrs. Robert W. McCully, and instructed the Secretary to send a letter of condolence to Dr. McCully.

There being no further business, the meeting adjourned.

C. P. ZEPP, *Secretary*.

---

### KANSAS VETERINARY MEDICAL ASSOCIATION

The twenty-fourth annual meeting of the Kansas Veterinary Medical Association was held at Wichita, January 4-5, 1928. Convention headquarters were at the Hotel Lassen, and over 125 veterinarians were present. The program was crowded and took most of the two days.

Mr. Allen W. Hinckle, president of the Wichita Chamber of Commerce, welcomed the visiting veterinarians, and Dr. E. F. Kubin, of McPherson, responded on behalf of the Association. The sessions were in charge of the president, Dr. R. C. Foulk, of Holton.

A splendid banquet was the attraction Wednesday evening. Dr. E. J. Frick, of Manhattan, was toastmaster. Dr. Harold Foght, Dr. R. R. Dykstra, Dr. B. W. Conrad and Dr. S. E. Hayes were the speakers. A dance for the visiting veterinarians and their wives followed the banquet.

New officers elected include the following: President, Dr. S. E. Hayes, Hutchinson; vice-president, Dr. E. L. Dicke, Louisburg; secretary-treasurer, Dr. Chas. W. Bower, Topeka. The Association voted to hold its next meeting in Topeka.

Fifteen specific subjects were discussed during the meeting. Dr. S. L. Stewart, of Olathe, followed the address of the President with a paper on "Physical Examination of Dairy Cattle." Dr. A. T. Kinsley, of Kansas City, Mo., talked on "Post-Vaccination Troubles," and Dr. T. J. Foley on "Some of the Common Diseases of Poultry." Major Geo. H. Koon, of Fort Leavenworth, spoke on "The Executive End of the Veterinary Corps and Its Relation to the Operating End." "Small Animal Problems, the Stud, the Matron, and the Pups," was the subject given by Dr. J. C. Flynn, of Kansas City, Mo. He also showed motion pictures of small-animal technic.

Dr. A. H. Gish, of Eldorado, opened the Thursday session with a paper on "Anaplasmosis in Cattle," and Dr. Chas. D. Folse, of Kansas City, spoke on "Workable Plan of Veterinary Advertising." Dr. J. H. Burt presented an illustrated lecture on European veterinary colleges, and Dr. Frank Breed, of Lincoln, Nebraska, spoke on "Bovine Abortion and Its Control." Dr. George E. Jacobi, of Kansas City, Mo., discussed "The Use of Oestral Hormones in Sterility." Dr. E. J. Frick, of Manhattan, gave "A Report of Some of Our Common Diseases." Dr. John Pugh, of Phillipsburg, gave a paper on "Sweet Clover Poisoning in Cattle," and Dr. L. E. Dietrich, of Wichita, completed the program with a paper on "Diseases of the Eye."

A mimeographed copy of the proceedings, including all of the papers and discussions, will be sent to all members in good standing. This custom was started last year and met with approval from the membership.

CHAS. W. BOWER, *Secretary.*

## OHIO STATE VETERINARY MEDICAL ASSOCIATION

The forty-fifth annual meeting of the Ohio State Veterinary Medical Association was held January 11-12, 1928, at the Deshler-Wallick Hotel, Columbus. The meeting was called to order by Dr. John F. Planz, of Akron, and special commendation is due Dr. Planz for his efficient handling of the entire session. The program dealt with the varied diseases of small animals, poultry, swine, sheep and the bovine.

About 200 were in attendance at the meeting, which was somewhat less than previous years, but this was due to the fact that all sessions were executive sessions, consequently only members in good standing could attend. The reports of the various standing committees were given on schedule and all reflected earnest effort on the part of the contributing membership of each.

The recommendation of the Committee on Resolutions that a Committee on Policy be formed was adopted; this committee to consist of ten members. The duties of this committee, as outlined, shall be to confer and discuss our veterinary problems with the presidents of our colleges, the directors of our educational institutions, and the deans of the various colleges directly concerned in veterinary education. It is a fact that public officials have not always been as alert as they might have been in dealing with various agencies affecting the veterinary profession and there is no doubt but that this newly created Committee on Policy will function for the good of the profession as a whole. The Committee will be composed, this year, of the chairmen of the nine other standing committees, with the appointment of one additional member, who will act as chairman.

Those who appeared on the program with special subjects were Dr. Reuben Hilty, president of the American Veterinary Medical Association; Dr. C. H. Covault, Iowa State College, on "The Diagnosis and Treatment of Some of the Common Diseases of the Dog"; Dr. F. A. Zimmer, State Veterinarian, on "Veterinary Service and the Various Agencies Restricting Such Service"; Dr. J. W. Jackman, Columbus, on "Nervous Diseases of the Dog"; Dr. F. R. Beaudette, New Jersey Agricultural Experiment Station, on "Diseases of Poultry"; Dr. A. J. DeFosset, B. A. I. Inspector-in-Charge, Columbus, on "The Necessity for Some Concerted Action in the Control and Eradication of Johne's Disease (Paratuberculosis)"; Dr. E. W. Roberts, Ohio Department of Agriculture, Reynoldsburg, on "Infectious Enteritis of



Swine"; Dr. E. T. Hallman, Michigan State College, on "The Practical Significance of Certain Pathological Alterations Due to *B. Abortus* Infection"; Dr. R. E. Rebrassier, Ohio State University, on "Internal Parasites of Poultry"; and Dr. B. L. Warwick, Ohio Agricultural Experiment Station, Wooster, on "The Heredity of Hernia in Swine."

The banquet and dance held the evening of the first day was attended by 182 persons, seventy of whom were the wives and sweethearts of the membership. These ladies were entertained by the Association at a theater party and a complimentary luncheon, followed by a musical program.

The Association adopted a definite policy for the prosecution of "quacks" which will be carried out through the employment of special council and a definite publicity campaign for the profession through the various news agencies of the State. This action, it is hoped, will stimulate the profession to a 100 per cent membership in the Association.

The officers elected for the ensuing year are: Dr. D. M. Swinehart, Columbus, president; Dr. Frank L. Carr, Alliance, vice-president; Dr. Walter R. Hobbs, Columbus, re-elected secretary; Dr. David C. Hyde, Columbus, re-elected treasurer. Dr. Alvin Broerman, Reynoldsburg; Dr. John W. Jackman, Columbus, and Dr. Bruce H. Edgington, Columbus, were elected as members of the Executive Committee.

The annual meeting and banquet of the Alumni Association, College of Veterinary Medicine, Ohio State University, was held the evening preceding the meeting of the State Association, in the beautiful Faculty Club quarters on the campus. The attendance was large as the wives and sweethearts were also included at this meeting. Dean David S. White was toastmaster and Dr. A. M. Bleile was the main speaker of the evening. Music was furnished by a male quartet composed entirely of students of the College of Veterinary Medicine. Dr. D. W. Ashcraft, the retiring president, presided in an efficient and capable manner.

D. M. SWINEHART,  
*Resident Secretary for Ohio.*

### MINNESOTA STATE VETERINARY MEDICAL ASSOCIATION

The thirty-first annual meeting of the Minnesota State Veterinary Medical Association was held at the Radisson Hotel,

Minneapolis, January 12-13, 1928. A maximum of 240 attended the sessions. The Secretary reported 223 active members and 11 honorary members on the roll. He further reported that the Association had been re-incorporated under the laws of Minnesota for 1926. This incorporation will be perpetual.

The Treasurer's report showed that approximately \$1,800.00 had been spent the past year for the prosecution of illegal practitioners in the State. This was collected in part by a special contribution and in part from the regular dues.

It was voted to eliminate the 1928 summer meeting, because of the meeting of the A. V. M. A., in August. Nine men were elected to active membership.

The chairmen of the committees were present and gave interesting and instructive reports. Dr. M. H. Reynolds presented a rather exhaustive report on publicity, pointing out the work that had been done, especially in the Eastern Iowa Association, along this line. In the discussion of this report, Dr. A. T. Kinsley pointed out that methods which would apply in one place, would not always be applicable in another, and that although publicity is very necessary for the success of veterinary medicine, as well as for live stock health in general, it can not always be given in exactly the same way.

Dr. D. B. Palmer and Dr. I. O. Burington presented the first paper, on "Observations on Hemorrhagic Septicemia in Transit Cattle." They pointed out that this disease was very common among cattle in transit, and that various methods used to control the infection had been to a large extent unavailing. They stated, however, that the use of hemorrhagic septicemia serum, combined with aggressin, occasionally gives fair results.

Dr. J. V. Lacroix, of Evanston, Ill., conducted a question-box on small-animal practice. The questions were those relating to the common diseases of small animals, and he paid particular attention to distemper and so-called frights disease. Dr. Lacroix stated that distemper in the later stages was largely incurable, but that if taken in time, under the proper conditions of environment, especially in relation to feeding, often times patients come through safely. Frights disease, in Dr. Lacroix's opinion, largely arises from derangements of the digestive tract.

In the evening, Professor C. H. Eckles, chief of the Division of Dairy Husbandry, University of Minnesota, gave a very interesting discussion on "Mineral Deficiencies of Rations Fed Dairy Cows in Minnesota." He pointed out that in this state certain

sections had a definite mineral deficiency which at first was thought to be calcium, but following careful experiments it was found that it was phosphorus. This leads not only to decreased milk-production and decreased flesh, but also to decreased reproduction, one calf every two years being a fair average for the affected farms. The addition of bone meal to the ration usually brought about satisfactory results.

Professor A. A. Hansen, Purdue University, Lafayette, Indiana, gave a very interesting discussion on "Poisonous Plants and Their Significance in the Production of Diseases of Animals." The plants or substances which are of greatest significance are white snakeroot, prussic acid, cocklebur sprouts, sweet clover and water hemlock or cowbane. Prussic acid is often found in fatal quantities, principally in frozen or wilted foliage of members of the grass family, notably in the frozen second growth of sorghum or Sudan grass, and in the young sprouts or wilted foliage of wild cherry. Professor Hansen showed illustrations of other poisonous plants of more or less secondary importance, which included, among others, Jimson weed, buckeye and horse chestnut, ergot, and Dutchman's breeches, and dwarf larkspur. He illustrated these various species by excellent colored pictures on the screen.

Dr. W. C. Bromaghin read an excellent paper on the control of tuberculosis in Minnesota, from its inception, in 1895, when Minneapolis enacted the first city ordinance in Minnesota, which demanded a tuberculin test and inspection of dairy herds contributing to its milk supply.

During the period of the first fourteen years there were tested 368,859 cattle with 17,663 reactors, which was 5.78 per cent infection. During the last few years or since area work has begun there have been tested 3,096,395 cattle which showed 2.76 per cent infection. The number of cattle tested since the tuberculosis control work started in Minnesota is 4,274,652. The indemnity paid by the State during this period is \$2,386,146.04, and the indemnity paid by the federal government, since federal cooperation started, is \$657,573.08. A retest of the first three counties that were certified as tuberculosis-free in Minnesota gave very satisfactory results, Traverse County in particular showing less than one-half of one per cent infection, this after a period of three years in which no testing had been done.

Dr. W. L. Boyd gave a very interesting discussion on "Diseases of Young Calves." He pointed out among other things that the

digestive disturbances were largely induced from defective diet, either too much food or not properly selected. Many of the diseases of calfhood can be remedied by careful attention to feeding. He stated that although various biologic agents had been used in the control of calf scours and calf pneumonia, in his experience they had not given very satisfactory results.

Dr. E. C. Rosenow, head of the Department of Bacteriology, Mayo Foundation, Rochester, Minnesota, discussed "The Bacteriology of Periodic Ophthalmia." He stated that he had been able to isolate a peculiar germ from the eyes of affected horses and, by inoculation, experiments tend to show that this organism would reproduce the condition as found naturally in horses, and he stated further that serologic results, especially agglutination phenomena, indicated that this organism was the true cause of periodic ophthalmia in horses.

Dr. B. A. Beach, of the University of Wisconsin, discussed "The Symptoms, Diagnosis and Control of Johne's Disease," which is becoming very prevalent in the United States. Veterinarians fail to recognize it because it is not commonly seen in practice. Sometimes the disease fails to show the characteristic diarrhea, which is diagnostic of the condition. After many years of work, Dr. Beach has been able to cultivate the organism successfully. It is a small acid-fast bacterium. He has also been able to produce a diagnostic agent, called johnin, which, when injected into an infected animal, produces a rise in temperature. This test is a reliable method of making a diagnosis, and its use indicates that the disease is more prevalent in herds than was formerly suspected. Indemnity is now paid by the federal government, in some states, for animals slaughtered because of Johne's disease.

Dr. C. F. Schlotthauer, of the Department of Experimental Medicine, Mayo Foundation, Rochester, presented a paper on "The Etiology of Milk Fever with Experimental Investigation." Dr. Schlotthauer presented a review of the literature on milk fever, and also some of his own investigations. In group one there were ten non-lactating cows less than two years of age.

The average blood sugar content of this group was 65.45 milligrams for each 100 cc. He presented also the increase of blood sugar in other groups of animals under different conditions. As a result of his work, Dr. Schlotthauer believes that the blood sugar of cows is not lowered by the sudden withdrawal of large quantities of milk, and in cows suffering from milk fever, there is an

increase in the total blood sugar which returns to its former level as the animal recovers.

Dr. J. H. Elmes, of Eagle Bend, presented a paper on "The Anatomy of the Head of the Horse with Comparative Reference to the Ox."

Dr. Guy Van Duzee, of Lamberton, gave a discussion of the veterinary practice acts of the various states. Dr. Van Duzee had made a very careful study of the various practice acts, and gave the members a résumé of the more important features involved in these acts. In his judgment, the practice act of Minnesota needs very careful revision.

The election of officers for the ensuing year resulted as follows: Dr. A. J. Thompson, Hutchinson, president; Dr. Harry Evenson, Sacred Heart, 1st vice-president; Dr. H. A. Ohlgren, Cokato, 2nd vice-president; Dr. C. P. Fitch, St. Paul, secretary-treasurer.

C. P. FITCH, *Secretary*.

---

#### TWENTIETH ANNUAL CONFERENCE FOR VETERINARIANS AT CORNELL UNIVERSITY

The twentieth annual conference for veterinarians was held at the New York State Veterinary College at Cornell University, January 12-13, 1928.

Dr. J. N. Frost presided during the morning session of the first day. Dean V. A. Moore opened the conference. Dr. E. Sunder-ville gave an illustrated talk on "The Anatomy of the Fowl for Postmortem Work." Dr. E. L. Brunett discussed "The Transmission of *Bacterium Pullorum* Infection Among Adult Chickens." These two papers were well received and were the source of valuable information in a line of work in which most veterinarians need help and instruction. Dr. H. W. Schoening, of the U. S. Bureau of Animal Industry, Washington, D. C., presented the results of his work, "The Vaccination of Dogs Against Rabies with Particular Relation to the Single-Dose Vaccine." Dr. R. L. Conklin, of MacDonald College, Quebec, gave his hearers some new and interesting thoughts in his discussion of "The Use of Colloidal Carbon Suspension in Veterinary and Human Medicine." Dr. W. E. Muldoon talked on "The Diseases in Captive Wild Animals from a Practitioner's Standpoint." Dr. Muldoon is veterinarian to a large circus corporation at Peru, Indiana. He made his topic well worth while. He brought to us the observations of a scientific practitioner in a field which holds much of



interest and possibilities for those engaged in veterinary activities. The papers were followed by a general discussion.

Dr. P. A. Fish presided during the afternoon session. Dr. W. W. Williams, of Springfield, Mass., discussed "The Physiological and Pathological Changes of the Ovary and Their Clinical Recognition." Every practitioner should study this paper, for it is the source of much valuable information in a field in which there is much of vital interest. Dr. C. M. Carpenter presented the results of *Brucella abortus* studies. He discussed two phases of the work: (a) "The Thermal Death Point of *Br. Abortus*," and (b) "A Report of Agglutination Tests on 3000 Samples of Human Sera." Dr. H. L. Gilman gave the next paper. The topic was "The Relation of the Bull to the Spread of the Bang Abortion Disease." Conclusions to be drawn from the paper are that evidence that the bull does transmit the infection to the cow is lacking, and while there is clinical evidence that he may spread the disease, there is a lack of evidence that he does. Dr. R. R. Birch talked on "Handling Bang Abortion Disease—A Program for the Veterinary Practitioner." Dr. Birch transmitted the results of his experimental work in the form of rather concrete suggestions for the production of clean herds.

Alumni association meetings were held during the evening of the first day. These meetings were followed by a smoker. There was no program.

Dr. R. R. Birch presided at the morning session of the second day. Dr. J. W. Benner gave an interesting talk and demonstration covering "Some Practical Points Concerning the Use of Anti-Hog Cholera Serum and Hog Cholera Virus." Dr. C. E. Hayden and Dr. P. A. Fish gave a joint paper, "The Blood of Animals in Health and Disease." Dr. Fish emphasized reasons for the effectiveness of the inflation treatment in milk fever. Dr. Hayden discussed the composition of the blood of animals from the standpoint of composition of samples taken from both normal and pathological animals. Drs. W. A. Hagan and A. Zeissig presented the results of their research work on "Johne's Disease and Johnin." Dr. F. B. Morrison has recently come to us as director of the Agricultural Experiment Station, Geneva, N. Y. Dr. Morrison discussed "The Importance of Minerals in Stock Feeding." Dr. G. W. Grim, Milk Control Officer, Ardmore, Pa., read an interesting paper, "Current Problems Concerning Milk Control." A general discussion ensued. This was followed by a luncheon at the College.



Dr. D. H. Udall presided at the afternoon session. Dr. H. J. Milks talked on "Physical Examination of Dogs." He illustrated his talk by the use of dogs brought in from the clinic. The next number was "Some Case Reports from the Small-Animal Clinic," by Dr. H. C. Stephenson. Dr. J. N. Frost gave a paper on "Osteomalacia," illustrating his talk with actual cases brought in from the clinic. Dr. M. G. Fincher gave an illustrated talk covering his work with horses during his sojourn in Kentucky last year. Many excellent lantern-slides were helpful in developing his topic, "Health Control in Breeding Animals."

The banquet was held at the Ithaca Hotel. Dr. V. A. Moore served as toastmaster. Dr. A. L. Danforth was to have spoken on "The New York State Veterinary Medical Society." He could not stay for the program and Dr. R. S. MacKellar very ably took his place. Dr. H. Preston Hoskins spoke on the topic, "The American Veterinary Medical Association." Dr. Hoskins pleased his audience with a very logical discussion of the work of the Association and of the part played by veterinarians present at the dinner in the work of the national organization. Dean Moore called on Dr. A. Atkinson, president of the Montana State College. Dr. Atkinson gave a short response in which he gave a fine tribute to the influence of Dr. Moore upon agriculture and the live stock industry in the West. Dr. James Sullivan, of the Department of Education, Albany, N. Y., talked on "Non-Professional Education for Veterinarians." President Livingston Farrand, of Cornell University, gave the last address. This banquet was a happy conclusion to a very fine conference for veterinarians.

C. E. HAYDEN,

*Resident Secretary for New York*

### IOWA VETERINARY MEDICAL ASSOCIATION

What was considered by all present to be the best all-round meeting of the Iowa Veterinary Medical Association was held at the Savery Hotel, Des Moines, January 17-18-19, 1928, with a clinic at Ames, January 20. Registration was required to gain admission again this year and showed an attendance of about 400. There were also in attendance over eighty members of the Ladies' Auxiliary. Mrs. Peter Malcolm and Mrs. J. A. Barger were re-elected president and secretary, respectively. The banquet was attended by about 375. County agents, representatives of the farm press and farm organizations and promi-

ment officials were guests at the banquet. The outstanding feature of the banquet was the apparent good fellowship between the county agent and the veterinarian. Thirty-four new members were added to the roll, bringing the total membership up to 540.

The following literary program was carried out:

- "Swine Diseases," Dr. Howard C. H. Kernkamp, St. Paul, Minn.
- \*"The Male Hog," Dr. B. H. Brooks, Riverton.
- \*"Problems Met in Feeding Commercial Feeds," Dr. T. G. Fultz, Pella.
- \*"Some Observations on 'Flu' in Swine," Dr. N. J. Deiling, Dallas Center.
- "Investigations on the Transmission and Etiology of Hog Flu," Dr. C. N. McBride, B. A. I. Research Farm, Ames.
- "Abortion Disease," Dr. C. P. Fitch, St. Paul, Minn.
- \*"Abortion Disease and the Practitioner," Dr. L. P. Scott, Waterloo.
- \*"Sheep Practice," Dr. Alonzo Goode, Milo.
- "Activities of the American Veterinary Medical Association," Dr. H. Preston Hoskins, Detroit, Mich.
- "Handling Reactor Cattle," Dr. H. Busman, B. A. I. Inspector-in-Charge, Chicago, Ill.
- \*"The Practitioner in Area Work," Dr. J. A. Spence, Clinton.
- "Paratuberculosis (John's Disease)," Dr. B. A. Beach, Madison, Wis.
- \*"Small-Animal Therapeutics and Practice," Dr. Chas. W. Bower, Topeka, Kans.
- \*"Tetanus in the Dog," Dr. F. F. Parker, Des Moines.
- \*"Strongylosis of the Horse," Dr. Guy S. Jones, Lohrville.
- \*"Some Case Reports," Dr. O. N. Schultz, Latimer.
- "Poultry Disease Situation in Iowa," Dr. S. H. McNutt, Ames.
- \*"Baby Chick Troubles," Dr. N. W. Ackerman, Van Horne.
- "Bacillary White Diarrhea," Dr. B. A. Beach, Madison, Wis.
- "Avian Tuberculosis," Dr. Elmer Lash, B. A. I., Des Moines.
- "Diseases of the Head and Respiratory System of the Fowl," Dr. Chas. Murray, Ames.

A very enjoyable banquet was held on Wednesday evening with Dr. H. D. Bergman as toastmaster. The following addresses were delivered:

- "The Veterinarian and His Relation to Public Health," Dr. C. P. Fitch, St. Paul, Minn.
- "Our Responsibility to Our Basic Industry," Mr. Chas. E. Hearst, President Iowa Farm Bureau Federation, Des Moines.
- "Making Prosperous Iowa," Mr. Henry A. Wallace, Editor, Wallace's Farmer, Des Moines.
- "Cooperation Between County Agents and Veterinarians," Mr. Lloyd Churchill, County Agent, Knoxville.

The clinic consisted of the following demonstrations:

#### POULTRY

- Anatomical demonstration of sinuses and air sacs of the fowl—Dr. H. L. Foust, Ames.
- Administration of parasiticides to birds and detection of internal parasites by autopsy—Dr. E. A. Benbrook, Ames.
- Demonstration of gross lesions of fowl typhoid, cholera, etc.—Drs. Chas. Murray and S. H. McNutt, Ames.

#### SMALL ANIMALS

- "Debarking" operation.
- Operations to correct tail defects.
- Oophorectomy.

\*Practitioner.

## LARGE ANIMALS

Roarer.  
Fistula of the withers.  
Enucleation of the eye.  
Inguinal hernia.  
Prolapsed rectum and vagina.  
Oophorectomy.  
Demonstration of the use of the emasculatome.

## The following resolutions were adopted:

1. The Association voted resolutions of thanks to Drs. Fitch, Beach, Kernkamp, Bower, Busman and Lash for coming from out of the State to contribute to our program.

2. Inasmuch as the Iowa Farm Bureau Federation has taken cognizance of the fact that vast sums of money are uselessly expended every year by the farmers of the State for purchase of stock foods and other preparations of doubtful value for the purpose for which they are usually sold, and the state of Iowa having inadequate laws at present for the regulation of sales and activities of agents,

Therefore, we heartily endorse the resolution adopted by the Iowa Farm Bureau Federation, and designated as resolution on "irresponsible salesmen."

And the Iowa Veterinary Medical Association desires to lend its active assistance and support to every effort the Iowa Farm Bureau Federation desires to make to correct this unfortunate situation.

And we further recommend that appropriate steps be taken to secure adequate legislation. In this connection attention is directed to legislation enacted in Kansas, and suggest the enactment of similar legislation, modified to meet Iowa conditions.

3. In the interest of the public health and the live stock industry, your Committee approves the sustained efforts made to eradicate tuberculosis from domestic animals. We commend the efforts of all those engaged in tuberculosis eradication work, and we further wish to lend our support and endorse the efforts of those who are engaged in field work, and who are making great personal sacrifices in an effort to render the greatest possible service to Iowa's basic industry and humanity.

4. Your Committee recommends that this Association go on record indicating its desire to cooperate to the fullest extent with the medical profession, to the end that the relation of infectious abortion in cattle and undulant or Malta fever in humans be better understood and controlled.

5. Your Committee wishes to direct the attention of this Association to the fact that the 1928 meeting of the American Veterinary Medical Association will be held at Minneapolis this summer, and urges the members of this Association to support the national association with large membership and attendance at the meeting.

6. We appreciate the cooperation of the Convention Bureau of the Chamber of Commerce in making our meeting in Des Moines pleasant and successful.

The following officers were elected for the ensuing year: President, Dr. J. C. Glenn, Norway, first vice-president, Dr. S. K. Hazlet, Oelwein; second vice-president, Dr. Henry Hell, Wilton Junction; secretary-treasurer, Dr. C. J. Scott, Knoxville; Executive Committee, Drs. N. J. Deiling, Dallas Center, and Guy S. Jones, Lohrville.

C. J. SCOTT, *Secretary.*

### INDIANA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Indiana Veterinary Medical Association was held at the Severin Hotel, Indianapolis, January 17-18-19, 1928. One of the best programs and a record attendance were features of the meeting. The spirit shown by the veterinarians in attendance would lead one to believe that all is well in the veterinary profession.

Numbered among the features on the program were men of national prominence, who gave liberally of their fund of knowledge to make this a great meeting. Dr. D. H. Udall, of Cornell University, talked on "Cattle Diseases." Dr. A. T. Kinsley, of Kansas City, Mo., discussed "Swine Problems." Dr. J. V. Lacroix, of Evanston, Ill., covered "Canine Practice." Dr. Edward A. Cahill, of Indianapolis, Ind., spoke on "Infectious Abortion." Dr. L. A. Merillat, of Evanston, Ill., took care of the problems in equine practice. Prof. Albert A. Hansen, of Purdue University, gave an excellent talk on milk sickness, and other conditions produced by eating poisonous plants. Prof. L. P. Doyle, of Purdue University, gave a very interesting and instructive talk on "Poultry Diseases." Dr. R. A. Craig, also of Purdue University, gave a general summary of the diseases of live stock prevalent throughout Indiana.

The Indiana veterinarians were honored by the presence of Dr. Reuben Hilty, of Toledo, Ohio, president of the American Veterinary Medical Association. He called to the attention of his audience the many improvements that are needed in the veterinary profession.

The election of officers resulted as follows: President, Dr. H. Meade Hamilton, Muncie; vice-president, Dr. F. W. Bratten, McCordsville; secretary-treasurer, Dr. R. A. Boyd, Indianapolis; directors, Dr. W. B. Craig, Indianapolis, and Dr. Thomas A. Sigler, Greencastle.

The meeting was conceded to be an excellent three-day post-graduate course and we feel sorry for those not able to attend.

R. H. BOYD, *Secretary.*

---

### MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Maryland State Veterinary Medical Association was held at Baltimore, January 19, 1928, with forty members in attendance.

The meeting was called to order by the President, Dr. F. W. Cruickshanks, of Hagerstown. The presidential address was a most optimistic one. Attention was called to the fact that the profession is passing out of a period of depression and beginning to feel the effects of a more prosperous animal industry. This is borne out by the reports from our veterinary colleges which, in most cases, find themselves with larger freshman classes. The research workers, the teachers, public service employees and practitioners are carrying on their work in a scientific manner.

Great progress has been made during the past year in the eradication of bovine tuberculosis. Other fields in which real strides have been made are contagious abortion and periodic ophthalmia. There is one field, however, that is being neglected to some extent. This is the supervision of market milk production. The veterinarian is well equipped by training, but if he does not give his best thought to this work, others will handle it less efficiently.

The year 1927 nearly saw the demise of the name "veterinarian." Several terms have been suggested in the hope of finding a more comprehensive one, but a satisfactory substitute has not as yet been agreed upon. In reviewing the field, it would seem that the veterinarian who is now mourning his ill luck, due to the passing of the horse, has not adapted himself to present-day conditions.

Dr. G. H. Grapp, of the State Board of Agriculture, next presented some very interesting facts on tuberculosis eradication work. He congratulated the veterinarians of the State for their splendid cooperation, and invited them to offer constructive criticism at any time.

Attention was called to the fact that at the time cooperative testing was started, in 1918, there was a feeling in certain quarters that the tuberculin-testing was being taken away from the private practitioners. Data were presented, however, which showed that the practitioners are testing more cattle today than they did in 1918. Information was also given in regard to making applications for accredited-herd work, retesting, and reporting the findings. The paper was followed by a discussion, and suggestions were offered which will prove of much value in the future.

Dr. R. A. Gregory, of Washington Grove, followed Dr. Grapp. He presented a most interesting paper on his experience with the sputum cup. The history of the first herd discussed is typical of the others. It is, therefore, being quoted as follows:



Upon the first of these herds we have a complete record of all the tests made over a period of six years. At the time of the original test, was March, 1921, the herd consisted of 16 animals, 5 of which were classed as reactors. In July of the same year, the 11 remaining animals were retested and 4 of them reacted. Another test was made in October of the same year, with no reactors found.

Subsequent tests were made once a year, and the herd gradually built up with tested animals purchased in accord with the accredited-herd plan, until 1925, at which time it consisted of 22 animals, one of which reacted upon the regular annual test applied by the veterinarian. A 90-day retest followed the removal of this reactor, and 9 more reactors were found. Following this retest and the removal of the 9 reactors, it was decided to take sputum samples from the remainder of the herd for guinea pig inoculation. The samples were taken from the remaining 13 animals and forwarded to College Park, where the inoculations were made, with the results that one of the guinea pigs showed generalized tuberculosis upon postmortem examination, approximately 70 days after inoculation. This guinea pig had received sputum from a grade Holstein cow, approximately 9 years old, who had been in the herd since the first test. It is of interest to note that, during the sputum test and the time necessitated in preparation for it, another 90 days had elapsed and another tuberculin test was applied and completed with the completion of the sputum test. This tuberculin test revealed 5 more reactors out of the remaining 13, but the old grade Holstein still remained negative. She was slaughtered however, and was a generalized case, with one open lung lesion as large as a cocoanut.

After the break occurred in this herd, none of the animals which reacted showed extensive lesions and it was very evident that these 15 reactors which were taken within a period of 6 months, were directly traceable to the generalized case which was detected by the sputum cup.

The final paper of the morning session was delivered by Dr. H. M. DeVolt, of the University of Maryland. The common diseases of poultry were discussed. The maladies receiving more detailed descriptions were bacillary white diarrhea, tuberculosis, roup, chicken pox, infectious bronchitis, coccidiosis and worms.

The veterinarians were advised to familiarize themselves with these diseases. It was also pointed out that the practitioners should be familiar with the usual poultry husbandry practices, as such information is most valuable in making proper contacts as well as in advising the owners of flocks on these subjects.

The first paper of the afternoon session was presented by Dr. R. R. Birch, of Cornell University. His subject was contagious abortion. Dr. Birch stated that about 40 per cent of infected cows eliminate the causative organism from their udders with the milk. The effects of these organisms on the udder, while not definitely known, are decided. The milk often has an unusually high cell-content. The milk records, as well as the condition of the herd, are usually better in animals free from the disease.

It can now be definitely stated that the disease may be eradicated by raising a free herd from the calves, or by disposing of the reactors. The interchange of animals in badly infected herds



should be carefully watched. Replacements in such cases should be made with infected animals.

The system sponsored at Cornell consists of making a herd survey, which includes blood-testing, inspection of premises and facilities, examination of the cattle for breeding troubles, and the removal of incurably sterile and unprofitable animals. In herds containing but a few reactors, the affected animals should usually be sold. In moderately infected herds the reactors should be separated from the healthy animals, if possible. In case this procedure is impracticable, the infected animals should be allowed to freshen while in isolation. In badly infected herds, it is usually advisable to raise clean animals. Vaccination should not be employed. The paper was followed by a very interesting discussion.

The next paper was entitled "Paratuberculosis," and was presented by Dr. E. B. Simonds, U. S. inspector-in-charge of tuberculosis eradication work in Maryland. The name "paratuberculosis" was used to designate this disease in the paper as that has to be used officially. The appropriation bill for paying for tuberculous cattle, which passed the last Congress, states that funds are available to pay for cattle condemned for tuberculosis and paratuberculosis. The state authorities have also agreed to use a portion of the funds they now have on hand to indemnify owners of cattle condemned on account of paratuberculosis. It is now possible to do some work in the control and eradication of this disease. The paper also included a discussion of the disease under the following topics: history, symptoms, diagnosis and postmortem findings. The subject was well handled and was followed by a most worthwhile discussion.

The last paper was entitled "Johne's Disease from the Practitioner's Viewpoint," and was presented by Dr. R. V. Smith, of Frederick. The speaker gave data on seven herds in which he had encountered the disease. His experience indicates that the malady can be eradicated from herds. The diagnostic agents, avian tuberculin and johnin, are not believed to be as reliable as tuberculin. It is also felt that laws are needed to control the inter- and intrastate movement of animals affected with this disease.

The business meeting was made as short as possible due to the lateness of the hour and the inclemency of the weather. The following resolution was passed:

WHEREAS, Certain veterinarians employed on a full time basis by the District of Columbia, the state of Maryland, and the federal government, privately practice their profession for fee, gift or reward, and

WHEREAS, Such private practice may seriously interfere with the proper application of official rules and regulations governing public health and live stock sanitation, inasmuch as such practice permits a personal and private contact between the veterinarian and the dairyman, which contact may easily produce a sense of personal obligation on the part of the veterinarian and thereby seriously affect the unbiased inspection required by official regulations, be it therefore

*Resolved*, That the Maryland State Veterinary Medical Association, in meeting assembled, on January 19, 1928, hereby go on record as disapproving such private practice, and be it further.

*Resolved*, That copies of these resolutions be forwarded to the commissioners of the District of Columbia, the Maryland State Board of Agriculture, and the chief of the United States Bureau of Animal Industry.

The officers elected for the ensuing year were: Dr. J. P. Turner, Washington, D. C., president; Dr. J. B. Koerner, Jr., Sykesville, Md., vice-president; Dr. E. M. Pickens, College Park, Md., secretary-treasurer, and Dr. R. C. Reed, College Park, Md., member of the Executive Board.

E. M. PICKENS, *Secretary*.

### CENTRAL CANADA VETERINARY ASSOCIATION

The annual meeting of the Central Canada Veterinary Association was held at Ottawa, January 23, 1928. The meeting was well attended and the different papers of the program were followed with the greatest interest.

"Foot-and-Mouth Disease" was dealt with by Dr. D. B. Rodger, of the British Ministry of Agriculture. This excellent paper was illustrated with lantern-slides and motion-picture film. Dr. Rodger particularly complimented the Health of Animals Branch of Canada on their success in keeping the Dominion free from this disease.

Dr. Maurice C. Hall, of the U. S. Bureau of Animal Industry, gave a very able and instructive address on "Parasitic Diseases, Their Prevention and Control." The subject was extremely valuable to members of the Association and especially when presented in the able and interesting manner in which Dr. Hall presents his subject.

Dr. R. L. Conklin, of Macdonald College, gave a very instructive address on "Metritis and Retained Placenta." This was illustrated with lantern-slides.

Dr. E. A. Watson gave a paper on "The Question of Immunity to Tuberculosis." This subject, one of the most important,

especially to veterinary officers of the Government, was followed with the greatest interest.

The last paper of the day, "Accidents Following Parturition," was given by Dr. E. Ming, M. P. P. This excellent address closed the technical program.

In the evening a banquet, held in honor of Dr. George Hilton, Veterinary Director General of Canada, concluded a very pleasant and most instructive meeting.

The Association has had a very successful year. Two excellent meetings have been held, and twenty-six new members admitted to membership.

CHAS. A. MITCHELL, *Secretary*.

### MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION

The twenty-second annual meeting of the Mississippi State Veterinary Medical Association convened at Jackson, January 23, 1928. The President, Dr. Wilbur McPherson, was unable to be in attendance, so the Vice-President, Dr. W. O. Hughes, of West Point, acted as chairman.

Dr. J. R. Alston read a paper on a nervous disease of cows following calving, poisoning by rotten sweet potatoes, and mastitis; Dr. C. D. Crawford on "Forage Poison"; Dr. C. B. Cain on "John's Disease"; Dr. F. J. Douglas on "Contagious Abortion"; Dr. Wm. P. Ferguson on "Unusual and Pitfall Cases"; Dr. E. P. Flower, state veterinarian of Louisiana, on "Anaplasmosis." Dr. F. J. Douglass gave an account of his field observations of anaplasmosis. Dr. Henry Boswell read a paper on "The Relation of Tuberculosis in the Lower Animals to Tuberculosis in the Human Family"; Dr. C. B. Cain on "Bacillary White Diarrhea of Poultry"; Hon. J. C. Holton on "The Cooperation of the Practicing Veterinarian with the Department of Agriculture" and Mr. C. T. Ames on "Dairying in Connection with Cotton Farming."

At the business session Dr. John Oliver, Jr., of Columbus, was elected a member of the State Examining Board. The election of officers for the ensuing year resulted as follows: Dr. W. O. Hughes, West Point, president; Dr. C. D. Crawford, Rolling Fork, 1st vice-president; Dr. E. B. Mount, Cleveland, 2nd vice-president; Dr. J. T. Alston, Tupelo, secretary-treasurer.

E. S. NORTON, *Secretary*.

## NECROLOGY

---

### CHARLES M. SHANE

Dr. Charles M. Shane, of Chetek, Wis., was instantly killed when his car was hit by a train, the night of December 3, 1927. He was returning from a call in the country and the accident occurred when he was almost home.

Born in Richland Center, Wis., January 1, 1887, Dr. Shane attended local grade and high schools and then entered the Kansas City Veterinary College. He received his degree in 1912. He located at Hillsboro, Wis., and built up a nice practice. When war was declared he entered the Veterinary Corps as first lieutenant and was stationed at Camp Lee. He sailed for France, October 13, 1918, and returned the following year. He was discharged at Camp Dix, July 7, 1919. Dr. Shane held a commission as captain in the Veterinary Reserve Corps, at the time of his death.

Upon returning to civil life, Dr. Shane located at Chetek, Wis. He was united in marriage to Miss Bertha Dodge, of Chetek, September 9, 1918. Three sons, Fay, John and Robert, are left behind. His mother, one sister and a brother also survive.

---

### JOHN J. FOY

Dr. John J. Foy, of New York City, died December 14, 1927, at the age of 65 years. The direct cause of death was pneumonia. He was a graduate of the New York College of Veterinary Surgeons, class of 1886, and had been in general practice ever since his graduation. He was a member of the Veterinary Medical Association of New York City for many years. Declining health necessitated his withdrawing from active membership a few years ago.

Dr. Foy was held in high esteem by all who knew him. He is survived by one daughter and two sons.

R. S. M.

---

### ROBERT RICHARDS

Dr. Robert Richards, of New York City, died December 22, 1927, at the age of 64 years. He was a graduate of the New York College of Veterinary Surgeons, class of 1887. He was engaged in general practice and for the past fifteen years was

veterinarian for the Department of Health of New York City in the Bronx district.

At the time of his death Dr. Richards was president of the Boston Terrier Club of New York and vice-president of the Boston Terrier Club of New Jersey. He was a past master of Eastern Star Lodge F. & A. M. of New York and was buried with full Masonic rites.

Dr. Richards was held in high esteem by his friends and clients and had the confidence and trust of his superiors in the Health Department. He is survived by his widow and one son.

R. S. M.

---

#### HARRY R. MORRIS

Dr. Harry R. Morris, of Omaha, Nebraska, died suddenly December 24, 1927, of heart disease. Born in Omaha, Dr. Morris was graduated from the Chicago Veterinary College, in 1909. He immediately entered in partnership with Dr. C. C. Hall, of Omaha. It is said that this was the oldest veterinary partnership in Nebraska. Dr. Morris is survived by his widow, three brothers and one sister. He was a member of the Masonic fraternity, the Elks and the Odd Fellows.

---

#### VICTOR J. ANDRE

Dr. Victor J. Andre, of Osceola, Ark., died January 9, 1928, following a stroke of paralysis. He was a graduate of the Ontario Veterinary College, class of 1899, and was formerly located at St. Genevieve, Mo.

---

#### ISOM E. SCRIPTURE

Dr. I. E. Scripture, of Frankfort, Indiana, died at his home, January 9, 1928, following an illness of two weeks caused by a stroke of apoplexy.

Born at Westport, Indiana, February 7, 1868, he attended local schools and then went to New York City, where he entered the American Veterinary College. He was graduated in 1893. He formed a partnership with Dr. D. C. Smith, of Frankfort, and practiced his profession until a short time ago.

Dr. Scripture was active in civic affairs and served as councilman-at-large from 1913 to 1917. For 35 years he was a member of the board of trustees of the Methodist Episcopal Church of his city. He is survived by his widow, one daughter, six brothers and one sister.

---

---

**B. W. KIRBY**

Dr. B. W. Kirby, of St. Paul, Minn., died February 2, 1928. Dr. Kirby was one of the oldest living graduates of the Chicago Veterinary College, having been a member of the class of 1886. For many years he was connected with the Health Department of the city of St. Paul.

---

**CHESTER MILLER**

Dr. Chester Miller, Inspector-in-Charge, Bureau of Animal Industry, at Duluth, Minnesota, died at St. Luke's Hospital, Duluth, February 4, 1928, after a brief illness.

Born on a farm near London, Ontario, February 27, 1872, Dr. Miller received his veterinary education at the Ontario Veterinary College and was graduated with the class of 1893.

After engaging in general practice for a few years, he entered the government service, being assigned to meat inspection at St. Louis. He was later in charge of meat inspection at Des Moines, Iowa; Sioux Falls, South Dakota; and Duluth.

Dr. Miller joined the A. V. M. A. in 1898. He was an active church worker and one of the deacons of the First Baptist Church, Duluth. He is survived by his widow, two daughters, several brothers and one sister.

R. D.

---

**H. O. SANFORD**

Dr. H. O. Sanford, of Tyndall, S. Dak., died February 5, 1928. Death was the result of pneumonia, following an operation for appendicitis. Dr. Sanford was a graduate of the Chicago Veterinary College, class of 1895, but was not actively engaged in the veterinary profession at the time of his death.

---

**THOMAS WHITE**

Dr. Thomas White, of Philadelphia, Pa., died at his home, February 8, 1928, aged 53 years. Cerebral hemorrhage was the cause of death. Dr. White was a native of Philadelphia and a graduate of the University of Pennsylvania, class of 1900. Immediately following his graduation, he entered the employ of the U. S. Bureau of Animal Industry and remained in the service until his death.

Dr. White joined the A. V. M. A. in 1918. He was a Mason and a member of the Elks. Five sisters, all of Philadelphia, survive him.

---



---

**ELIJAH MATHEWS**

Dr. Elijah Mathews, of Jersey City, N. J., died February 9, 1928, at the Morristown (N. J.) Hospital, where he had been a patient for several weeks, following an operation for stomach trouble. He was 68 years of age.

Born in Bucks County, Pennsylvania, Dr. Mathews was graduated from the New York College of Veterinary Surgeons in 1894, and practiced in Jersey City continuously.

Dr. Mathews joined the A. V. M. A. in 1901. He was a member of Enterprise Lodge, F. & A. M., and Mount Vernon Chapter, Hugh de Payne Commandery. The funeral services were held at the Masonic Temple and were attended by a number of Dr. Mathews' professional colleagues. He is survived by his widow, two sons, one brother and two sisters.

---

**EDWIN R. STRUVE**

Dr. Edwin R. Struve, of Coffeyville, Kansas, died February 13, 1928. He was a graduate of the Ontario Veterinary College, class of 1903.

---

**L. L. LINDSEY**

Dr. L. L. Lindsey, of Graettinger, Iowa, died in an Estherville, Iowa, hospital, February 18, 1928, of pneumonia, following an operation for appendicitis. He was born at Akron, Iowa, in 1885 and was a graduate of the Kansas City Veterinary College, class of 1914. He practiced as an assistant to Dr. G. P. Statter, of Sioux City, for two years and then located at Graettinger, where he remained until his death.

Dr. Lindsey joined the A. V. M. A. in 1919. He was also a member of the Iowa Veterinary Medical Association. He was mayor of his town and a member of the school board and other civic organizations. He is survived by his widow and several children.

---

**J. W. OTTO**

Dr. J. W. Otto, of Magnolia, Ill., died suddenly, at his home, March 3, 1928. Death was attributed to heart disease. Dr. Otto was born in Magnolia, attended the local grade and high schools, and was a graduate of the Chicago Veterinary College, class of 1894. He is survived by his widow, one son, one brother and five sisters.

---

---

**M. P. GRICE**

Dr. M. P. Grice, of Allegan, Mich., died at his home, March 6, 1928, at the age of 79. He was a registered non-graduate practitioner and had been located at Allegan since 1876.

---

**WILLIAM FOLSETTER**

Dr. William Folsetter, of Dallas, Texas, died March 7, 1928, at a Dallas hospital, at the age of 83. He was a graduate of the Ontario Veterinary College, class of 1874, and had been a resident of Dallas since 1880. He was City Veterinarian for many years and was regarded by his colleagues as a very capable veterinarian. No relatives living in the United States survive him.

---

**HENRY AMLING**

Dr. Henry Amling, of New York City, met death by accidental asphyxiation, March 18, 1928. A strong wind blowing through a partly opened window in his bedroom is believed to have extinguished a gas heater near the bed in which Dr. Amling was sleeping.

Born in Brooklyn, April 12, 1865, Dr. Amling was sent to State Center, Iowa, as a boy of eleven. Later he returned to the East and spent three years at the Brighton Beach race track. His fondness for animals led him to enter the New York College of Veterinary Surgeons, from which he was graduated in 1893. He entered practice at 4228 Park Avenue and it was at this address, in a bedroom over his office, that he met his untimely death.

In 1898 Dr. Amling became veterinarian to the Bronx Zoo. He retained this connection until 1903. He specialized in the treatment of wild animals and he was frequently called to all parts of the United States to render veterinary services to animals belonging to circuses. Bostock and Hagenbeck were numbered among his clients. He was known throughout the theatrical profession and had attended many of the prominent animals exhibited in show circuits throughout the country.

Dr. Amling joined the A. V. M. A. in 1913 and attended meetings frequently. He was a charter member of the Veterinary Medical Association of New York City. He was Past Master of Marion Lodge 278, F. and A. M. He is survived by his widow and two sons.

---

---

**LEOPOLD HAY**

Dr. Leopold Hay, of Faribault, Minnesota, died March 12, 1928, of valvular disease of the heart. Although his health began to fail during the winter, he was not confined to his home until the first of February.

Born in Warsaw, Poland, in 1873, the son of a member of the diplomatic service of Great Britain stationed in Poland at that time, Dr. Hay came to America at a very early age. He was graduated from the Ontario Agricultural College, at Guelph, in 1893, and from the Ontario Veterinary College, in 1896. He immediately located in Faribault and continued in active practice up to the time of his death.

Dr. Hay joined the A. V. M. A. in 1910. He was a charter member of the Minnesota State Veterinary Medical Association, and had been secretary of the Minnesota State Veterinary Examining Board for more than twenty years. He was one of the best known practitioners in the state of Minnesota and his outstanding qualities, both as a veterinarian and as a man, were recognized by all who knew him.

A wife and one daughter survive.

C. P. F.

---

**BERNARD HARMON**

Dr. Bernard Harmon, of Decorah, Iowa, died January 20, 1928. He was a graduate of the Ontario Veterinary College, class of 1895, and practiced at Decorah since graduation. Dr. Harmon was a Civil War veteran and was 79 years old when he died.

---

**MRS. AUGUSTA STEVENS MARSHALL**

Mrs. Augusta Stevens Marshall, wife of Dr. Clarence J. Marshall, of Philadelphia, died at her home, March 12, 1928. Pneumonia was the immediate cause of death, although she had not been in good health for some time. Mrs. Marshall was known to many members of the profession through her attendance at many A. V. M. A. conventions and Dr. Marshall's long connection with the University of Pennsylvania Veterinary School.

---

Our sympathy goes out to Dr. C. P. Fitch, of St. Paul, Minnesota, in the death of his mother, recently; to Dr. L. J. Tompkins, of Middletown, N. Y., in the death of his wife, January 19, 1928; and to Dr. and Mrs. N. R. Yarbaugh, of Auburn, Iowa, in the death of their six-months-old daughter, March 4, 1928.

---

## PERSONALS

### MARRIAGES

Dr. Francis H. McClean (T. H. '13), of Pittsfield, Ill., to Miss Floye Northup, of Jacksonville, Ill., Feb. 22, 1928, at Jerseyville, Ill.

Lt. L. R. Bower (Corn. '22), of Fort Sam Houston, Texas, to Miss Florence M. Menefee, of San Antonio, Texas, March 24, 1928.

### BIRTHS

To Dr. and Mrs. Frank M. Wilson, of Mechanicsville, Iowa, a daughter, Virginia Page, January 3, 1928.

To Dr. and Mrs. Alan S. Vansant, of Fox Chase, Philadelphia, Pa., a daughter, Mary Arentson, January 8, 1928.

To Dr. and Mrs. R. Schaap, of Pipestone, Minn., a son, Donald Henry, January 31, 1928.

To Dr. and Mrs. Joseph S. Matteson, of Parnell, Mo., a daughter, Mary Phyllis, January 31, 1928.

To Dr. and Mrs. A. H. Williams, of Williams, Iowa, a son, Arthur Dean, January, 1928.

To Dr. and Mrs. E. R. Carpenter, of Minnesota Lake, Minn., a daughter, February 16, 1928.

To Dr. and Mrs. V. H. Miller, of Toledo, Ohio, a daughter, Lois Ann, February 22, 1928.

To Dr. and Mrs. C. Mercer Thomas, of Nassawadox, Va., a daughter, Janet Margaret, March 4, 1928.

To Dr. and Mrs. R. J. Wilkinson, of Buffalo, N. Y., a son, March 9, 1928.

### PERSONALS

Dr. Geo. W. Thurber (Chi. '13) has removed from Loyal, Wis., to Necedah, Wis.

Dr. Peter F. Runyon (U. P. '12) was recently elected mayor of Freehold, N. J.

Dr. F. L. Rogers (O. S. U. '26), formerly of Cadiz, Ohio, is now at Granville, Ohio.

Dr. H. L. Winder (Chi. '13), of Sheridan, Ill., has opened a branch office at Sandwich, Ill.

Dr. D. H. Bennett (U. P. '15), of Norwalk, Conn., is now located in San Angelo, Texas.

Dr. S. A. Goldberg (Corn. '14) is laboratory director at the Bronx Hospital, Brooklyn, N. Y.

Dr. C. B. Estey (Ont. '05-McK. '06) holds the position of city dairy inspector of St. Cloud, Minn.

Dr. L. F. Vaughn (K. C. V. C. '16), formerly located at Los Banos, Calif., is now at Gilroy, Calif.

Dr. F. C. Sundstrom (K. C. V. C. '18), formerly of Ravenna, Nebr., located at Shelton, Nebr., March 1.

Dr. L. L. Dunn (Iowa '24), formerly of Harrisburg, S. Dak., is now practicing at Dell Rapids, S. Dak.

Dr. N. D. Hedges (Ind. '21), formerly of Russellville, Ky., located at Williamstown, Ky., January 1.

Dr. H. Rasmussen (McK. '13), who was formerly located at Tyler, Minn., has removed to Balaton, Minn.

Dr. M. J. Hughes (N. Y. U. '20), of Newark, N. J., has moved his office from 542 Broadway to 415 Grove St.

Dr. H. C. Johnson (A. P. I. '26), formerly of Nauvoo, Ala., has located at Athens, Ala., for general practice.

Dr. R. H. Stewart (A. P. I. '22), formerly of Belzoni, Miss., removed to Indianola, Miss., about February 1.

Dr. C. L. Barnes (Corn. '00) gives us a new address: 20 Saratoga National Bank Bldg., Saratoga Springs, N. Y.

Dr. Ellsworth McElwee (O. S. U. '27), who has been located at New Albany, Ohio, is now practicing in Lisbon, Ohio.

Dr. J. E. Burton (Ind. '17), formerly at New Castle, Pa., now receives his mail at Slippery Rock, Route No. 4, Pa.

Dr. E. M. Kennelly (Corn. '25) is assistant county veterinary of Sullivan County, with headquarters at Liberty, N. Y.

Dr. Jos. Emonts (K. C. V. C. '08), formerly of O'Fallon, Mo., has taken up a new location at 1521 Clay St., St. Charles, Mo.

Dr. J. T. Gruber (O. S. U. '08) holds the position of meat and milk inspector for the Board of Health for the city of Marion, Ohio.

Dr. E. E. Behrens (U. P. '12) has been appointed Supervising Cattle, Food, Meat and Milk Inspector for the city of Philadelphia.

Dr. Milton R. Sharp (Colo. '26), formerly of State College, N. Mex., has removed to Tulsa, Okla. Address: 1233 East Admiral.

Dr. Cassius Way (Corn. '07), of New York City, accompanied by Mrs. Way sailed for Europe, February 11, to be gone until April 1.

Dr. C. R. Baldwin (Corn. '06) was elected mayor of Fulton, N. Y., at the fall elections. He entered upon his new duties January 1.

Dr. C. L. Kronfeld (Chi. '17), formerly located at Braeburn, Pa., is now located at New Kensington, Pa. Address: 518 Seventh St.

Dr. T. A. Sigler (Ind. '02), of Greencastle, Ind., was the principal speaker at a recent meeting of the Rotary Club of Connersville, Ind.

---

Dr. V. H. Miller (O. S. U. '24) has been transferred from Hamilton, Ohio, to Toledo, Ohio. His Toledo address is 2417 Maplewood Ave.

---

Dr. L. J. Tompkins (N. Y. C. V. S. '13), formerly of Newburgh, N. Y., is now located in Middletown, N. Y. Address: 42 Prospect Ave.

---

Dr. E. E. Johnson (Mich. '27), of LeRoy, Mich., has accepted a position as assistant to Dr. Willis L. Brenton (Ont. '03), of Detroit, Mich.

---

Dr. C. McCandless (Chi. '15), of Lisbon, Ohio, has been taking the practitioners' course at the University of Pennsylvania Veterinary School.

---

Dr. Chas. J. Coon (K. S. A. C. '24) has accepted a position in the Department of Bacteriology at Kansas State Agricultural College, Manhattan.

---

Dr. Augustus M. Fisher (U. P. '12) has opened an office for the practice of veterinary medicine and surgery, at 238 South 22nd St., Philadelphia, Pa.

---

Dr. G. M. Simmons (Iowa '25) is resident veterinarian at the veterinary hospital of the San Francisco Society for the Prevention of Cruelty to Animals.

---

Dr. Fred D. Wood (U. P. '24), formerly of Ardmore, Pa., recently moved into his new hospital at Landsowne Avenue and State Road, Upper Darby, Pa.

---

Dr. C. B. Frederick (O. S. U. '00), of Canton, Ohio, returned to his practice the first week in March, after a sojourn in the Southland for about six weeks.

---

Dr. O. L. Sims (O. S. U. '11), of Pleasantville, Ohio, has announced his candidacy for election as representative to the Ohio Assembly from Fairfield County.

---

Dr. D. E. Sisk (K. C. V. C. '15), who has been spending the winter at Perry, Okla., returned to his home in Mansfield, Ill., during the past month.

---

Dr. E. C. Deubler (U. P. '11) was elected president of the Pennsylvania Ayreshire Breeders' Association at the annual meeting, held in Harrisburg, in January.

---

Dr. Warren P. S. Hall (Mich. '20), a member of the meat inspection staff of the Detroit Department of Health, underwent an operation for appendicitis March 12.

---

Dr. S. A. Schneidman (Corn. '15) has resumed his practice of veterinary medicine at Bellaire, Long Island, N. Y., after having conducted a pharmacy for some time.

---

Dr. S. T. Howland (U. P. '14), of Whitman, Mass., recently underwent an operation and reports are to the effect that he is making satisfactory progress toward recovery.

---

Dr. T. P. Gallahue (Chi. '17), of Monmouth, Ill., has been appointed Lake County Veterinarian for one year at a salary of \$4100. He entered upon his duties February 1.



Dr. J. S. Allen (Chi. '20), formerly of Nampa, Idaho, is now located at Idaho Falls, Idaho, where he recently purchased the practice of Dr. J. C. Sorensen (Colo. '15).

---

Dr. Ramon A. Acevedo (K. S. A. C. '27), who has been at the University of Minnesota the past winter, sailed for his home in the Philippines, the latter part of March.

---

Dr. Donald K. Collins (O. S. U. '26), formerly of Malden, Mass., has accepted a position as assistant veterinarian for the San Francisco Society for the Prevention of Cruelty to Animals.

---

Dr. James Morris (Iowa '21), of Logan, Iowa, who has been assisting in area work in Linn County, has been assigned Inspector-in-Charge of Harrison County, with headquarters at Logan.

---

Dr. H. J. Washburn (Col. '98), chief of the Pathological Division, B. A. I., who has been seriously ill in Garfield Hospital, Washington, has recovered sufficiently to be able to return to his home.

---

Dr. M. H. Kyle (Chi. '96), of Chatsworth, Ill., has been appointed poultry disease specialist on the staff of the Poultry Husbandry Division of the State Department of Agriculture of Illinois, by Governor Small.

---

Dr. B. L. Lake (Chi. '12) has accepted the position of Warren County (Ill.) Veterinarian and began work February 20. Dr. Lake will move his family to Monmouth, Ill. He will have his office in the Court House.

---

Dr. E. F. Johnston (Ont. '22), of Carp, Ont., has recovered from an operation for appendicitis, performed several months ago. Mrs. Johnston underwent the same operation at about the same time as Dr. Johnston.

---

Dr. L. B. Ernest (U. S. C. V. S. '15), of the Tuberculosis Eradication Division, B. A. I., recently underwent an operation for appendicitis, in Washington D. C. Recovery has been rather slow, due to arthritic complications.

---

Dr. E. A. Watson (Ont. '04), Pathologist, Health of Animals Branch, Canada Department of Agriculture, advises us of his change of address from Biological Laboratory, Ottawa, to Research Station, Mountain Road, Hull, Que.

---

Dr. E. F. Graves (K. S. A. C. '27) has secured a leave of absence as territorial veterinarian of Alaska and recently visited his parents in Manhattan, Kans. Dr. Graves has been conducting investigations in fox diseases in Alaska.

---

Dr. G. P. Mayer (Chi. '15), of Elk Rapids, Mich., is now in charge of tuberculosis eradication work in Huron County with headquarters at Bad Axe, Mich. Dr. Mayer recently returned to his work, after a sick leave of two months and a half.

---

Dr. E. A. Tunncliff (K. S. A. C. '21) has tendered his resignation as a member of the staff of the Department of Animal Husbandry, University of Illinois, effective March 1, to accept a position at the Ranch Experiment Station, Sonora, Texas.

Dr. Arthur Spitz (U. P. '07), a member of the Philadelphia staff of the B. A. I., was seriously injured in a collision of two automobiles with a trolley car near his home recently. Latest available reports indicate that Dr. Spitz is making satisfactory progress toward recovery.

Dr. M. O. Robinson (U. P. '25), who has been pursuing postgraduate studies at the University of Wisconsin during the past winter, has accepted a position with the Scott-Powell Dairies, Inc., of Philadelphia, and has charge of their laboratory and field work in milk hygiene.

Dr. J. H. McCoy (Wash. '15) was appointed to the newly combined office of meat and milk inspector for the city of Bellingham, Wash., effective January 1. As there never had been any meat inspection system in Bellingham, Dr. McCoy has found himself very busy getting the work established and systematized.

Dr. Raymond E. Lubbehusen (O. S. U. '18), formerly associated with Dr. C. P. Fitch (Corn. '11), University Farm, St. Paul, Minn., assumed a position with the Laboratory of the Pennsylvania Bureau of Animal Industry, Harrisburg, on March 1. Dr. Lubbehusen will conduct special investigational work on poultry diseases.

Dr. E. J. Balliet (U. P. '14), of Northampton, Pa., has been appointed chairman of a committee of the Northampton Rotary Club to organize a boy's feeding and finance club. The club will use swine for their project. One of the outstanding features in the proposed work will be the proper protection of the animals against parasitic and other diseases.

Major R. A. Kelser (Geo. Wash. '14), who has been stationed in Manila as a member of the Medical Department Research Board, plans to visit China and Japan during the month of April, before starting back to the United States by way of Europe. Major Kelser expects to arrive in New York about July 29. After April 1, mail for Major Kelser should be addressed to him at the Army Medical School, Army Medical Center, Washington, D. C.

Dr. D. B. Rodger (R. C. V. S. '06), of the Ministry of Agriculture and Fisheries of Great Britain, who has been located in Montreal, Canada for some time, has left there for duty in South America. Dr. Rodger attended the meeting of the A. V. M. A. in Philadelphia last year and writes that he has very pleasant memories of the meeting and hopes to keep in touch with professional matters, both American and Canadian, through the medium of the JOURNAL.

Dr. Alfred Savage (Corn. '14), of Winnipeg, Man., who has been pursuing postgraduate work at the Royal (Dick) Veterinary College, Edinburgh, Scotland, as reported in a recent number of the JOURNAL, writes that he flew the English Channel just before Christmas and visited the veterinary school at Alfort, Paris. Dr. Savage heartily recommends the Imperial Airways to all and sundry who might contemplate such means of travel in the future. He says that this mode of transportation certainly has tippily steamers and squealing little French trains all beaten to death.

---

#### FAVORABLE PROGNOSIS

Doctor—How do your broken ribs feel today?

Patient—Fine, doctor; but I've had a stitch in my side all morning.

Doctor—Great! That shows the bones are knitting.

**Jen-Sal**

## FOR THE HEALTH OF THE HERDS

THREE Outstanding Important  
and Reliable

### IMMUNIZING AGENTS

For the control of a group of most important animal  
diseases

PRODUCED AT JEN-SAL BIOLOGICAL FARM



**JEN-SAL ANTHRAX AGGRESSIN**—A product developed by our laboratories, which holds promise of revolutionizing the control of anthrax. It insures immunity when immunity is needed.

**JEN-SAL BLACKLEG AGGRESSIN**—A distinctive product, free from undesirable precipitates; made with positively identified cultures of *Clostridium chauveti*.

**JEN-SAL HEMORRHAGIC SEPTICEMIA AGGRESSIN**—A tissue exudate, free not only from organisms, but also from harmful toxins; thoroughly tested to insure safety.

See Current Issues of Jen-Sal Journal for listing of packages and prices

**JENSEN-SALSBERY LABORATORIES INC.**  
KANSAS CITY, MO.

## THE CORNELL VETERINARIAN

"It is not fair that your journal is not properly advertised to the profession. I would have subscribed long ago, but I thought it was an alumni publication. It contains a wealth of information that practitioners need."—MICHIGAN.

Quarterly

ITHACA, N. Y.

\$2



A. V. M. A.  
EMBLEMS

AUTOMOBILE . . . \$1.25  
LAPEL . . . . . .50

Send Post Office or Express Money Orders.  
Do not Send Stamps.

American Veterinary Medical Association  
716 Book Bldg., DETROIT, MICH.

## Feed Pure SALT



Feed salt that is free from dangerous chemicals. Feed this pure salt in just the quantities horses want and need. In fact—let them salt themselves—as much or as little as they please, when they please.

**Compressed  
Pure-Salt Bricks**

In convenient holders make salt easy for you. Right salting pays. Ask dealer and write for booklet. Belmont Stable Supply Co., Patentees and Manufacturers—82 Gidney Way, White Plains, N.Y.

## In Man and Beast Alike

inflammation can be removed or overcome by therapeutic application of the time-proven physiological principles of moist heat, stimulation of peripheral reflexes, dilatation of capillaries, abstraction of fluid from tissues and blood, absorption of exudates, activation of nutritive and leucocytic processes.

*Antiphlogistine*  
TRADE MARK

has proven its practical value in MASTITIS, STRANGLES, DISTEMPER, TENDINITIS; SYNOVIAL ARTICULAR OR PERIOSTEAL INFLAMMATION: CONUSION: SPRAIN: SURGICAL OR ACCIDENTAL WOUNDS: PNEUMONIA: PLEURISY: or other INFLAMMATORY ORGANIC DISEASE.

Relieves pain. Reduces swelling. Overcomes inflammation. Opposes bacterial action and therefore occupies a place in Veterinary Practice unapproachable by any imitation or substitute.

Apply hot, and thick, on absorbent cotton and bandage snugly.

*We will gladly send you a regular package  
with interesting and valuable booklet, gratis*

THE DENVER CHEMICAL MFG. CO.

New York

U. S. A.

IN ACTINOMYCOSIS,

**SIOMINE**

is practically a specific.

The dose for large animals is one 10 gr. capsule,  
given with feed two or three times daily.

ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE A.M.A.

**SIOMINE** is an organic iodide containing 78.5 per cent. available iodine. It is widely used in human medicine wherever internal treatment with iodine or iodides is indicated. It is equally valuable in veterinary practice, a most economical and convenient form of Iodine for large and small animals. Supplied in capsules of 1-2 to 10 grs., to meet all indications. Write for literature and suggested indications.

**PITMAN-MOORE COMPANY**  
INDIANAPOLIS



You can help your clients keep their dogs in good condition by recommending a diet including Miller's balanced Dog Foods. These blends of pure food essentials build up vitality in a remarkably short time and are also good daily regulators.

Many veterinarians recommend and sell Miller's A-1 Dog Foods. Write for generous samples and special prices.

**BATTLE CREEK DOG FOOD CO.**

442 State St.

BATTLE CREEK, MICHIGAN

## THE VETERINARY RECORD

Founded 1888

A weekly journal for the  
Profession

*Published by the*  
**National Veterinary Medical Association**  
of Great Britain and Ireland

10, Gray's Inn Square,  
London, W. C. 1,  
England

Subscription, \$12.60 per annum, post free.

*"Feeling fine!  
Just had a Colton  
capsule."*



See your jobber about Colton empty Veterinary Capsules of a Quality and Fit excelled by none.

**ARTHUR COLTON COMPANY**

2600 East Jefferson Avenue  
DETROIT, MICH.



# RABIES VACCINE, Veterinary, P. D. & Co.



*Advanced Case of Rabies.  
Paralysis of Lower Jaw and Hind Extremities.*

Our Rabies Vaccine, Veterinary, is prepared with precisely the same degree of care and skill as any biological product manufactured for human use. It has the following desirable features:

**Does not contain living virus.**

It is a killed virus vaccine incapable of producing rabies incidental to vaccination.

**Is tested for safety on laboratory animals and for sterility by three independent bacteriological tests**

Assuring safety and protection from complications.

## RABIES VACCINE, VETERINARY

Bio. 800. Supplied in 5-cc. rubber diaphragm stoppered bottles at 65c.

Bio. 801. In packages containing six 5-cc. bottles at \$3.50.

LIST PRICE SUBJECT TO DISCOUNT.

*A certificate and metal tag are furnished with each dose.*

# PARKE, DAVIS & COMPANY

Detroit, Michigan

Walkerville, Ontario



# COOPER'S SAPONIFIED CRESOL SOLUTION

(50% CRESOL)

**The Dependable Disinfectant For  
Cleaning Up After Tuberculin Testing.**

*An officially approved substitute for Liquor Cresolis Compositus  
in disinfection work under B. A. I. or State Control.*

**Always of uniform strength.  
Always priced right.**

**WILLIAM COOPER & NEPHEWS, INC.**  
152 West Huron St. CHICAGO, ILL.

## Liability Insurance For Veterinarians

can be obtained only by members of the A. V. M. A. Avail yourself of this privilege by sending in your application to your secretary. Dr. Hoskins will be glad to supply you with new forms if you have misplaced the one sent you.

**Goerlich & Goerlich**

**New York City**

## UNIVERSITY OF PENNSYLVANIA SCHOOL OF VETERINARY MEDICINE PHILADELPHIA

In addition to the regular four-year course in Veterinary Medicine, there are now offered:

**Graduate Courses** in Pathology and Bacteriology (including immunology) extending through one session.

**Special Courses** in Small Animal Diseases and in Diseases of Poultry arranged especially for practitioners and extending through four weeks.

*For Catalogue and further information, address*

**LOUIS A. KLEIN, V. M. D.**

**Dean, Veterinary Faculty**

# ***Reduce Losses*** **from Bovine Infectious Abortion**



It is a proven fact that abortions among cattle may be limited by the proper use of TRUE, LIVING CULTURES of the BACILLUS of BANG.

## **Mulford Bovine Abortion Serovaccine**

Is a true, living culture of the Bacillus of Bang.

Is an exceedingly heavy suspension (25,000 million organisms per cc).

Is a sensitized vaccine, therefore, the heavy suspension may be used without causing undue local or systemic reaction.

**Actually limits abortions in infected herds**



Supplied in 20 cc vials (single-dose treatment).

Write for detailed information and suggested plan of action.



60534

H. K. MULFORD COMPANY, Philadelphia, U. S. A.

# **Mulford**

THE PIONEER BIOLOGICAL LABORATORIES

## **THE OHIO STATE UNIVERSITY**

**College of Veterinary Medicine  
COLUMBUS, O.**

Offers a four-year graded course leading to the degree of Doctor of Veterinary Medicine. Unexcelled laboratory and clinical facilities. New buildings especially designed for teaching veterinary medicine according to the most approved modern methods. Faculty and specialists devoting whole time to teaching. For College Bulletins, address

**DAVID S. WHITE, Dean**

## **NEW YORK STATE VETERINARY COLLEGE**

**ESTABLISHED AT**

**Cornell University, Ithaca, N. Y.**

**By Chapter 153, Laws of 1894**

This college is well equipped with modern facilities for scientific and practical instruction for undergraduates. Most varied practice for students in the free clinics. Regular graded course, four years of nine months each. Entrance by Regents' "Veterinary Student Certificate," or by examination, September, 1927. Matriculation, September 24, 1928.

**Tuition Free to New York State Students**

For extended announcement, address

**Professor VERANUS A. MOORE, Director.**

## **MICHIGAN STATE COLLEGE**

**Of Agriculture and Applied Science**

**DIVISION OF VETERINARY MEDICINE**

A well-equipped college, having excellent facilities for both scientific and practical instruction in a modern, four-year graded course of Veterinary Science, and leading to the degree of Doctor of Veterinary Medicine (D. V. M.). A new building especially designed for clinical and surgical instruction, an intimate relation with courses in Animal Husbandry and a faculty devoting its entire time to teaching offers unexcelled opportunities. Begins its eighteenth year September 17, 1928.

**Tuition free to residents of Michigan**

For college bulletins and information, address

**WARD GILTNER, Dean, East Lansing, Michigan**

## **School of Veterinary Medicine AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS**

**College Station, Texas**

Accredited by the American Veterinary Medical Association and the United States Department of Agriculture

Offers a four-year graded course leading to the degree of Doctor of Veterinary Medicine

Large hospital and ambulatory clinics

**Tuition Free**

For catalogue and other information, address, **Mark Francis, Dean**

# SAVE THE CHICKS



The hatching season is here. Increase your income by building up a Poultry Practice. The following are unexcelled in the treatment of poultry diseases.

## **For Bacillary White Diarrhea of Chicks**

Abbott's Poultry Cholera Tablets. Supplied in packages of one hundred and one thousand, and in bulk.

## **For Roup**

Use Calcidin internally and Chlorazene as a local antiseptic. Mixed Infection Bacterin (Avian) is an immunizing agent.

---

*We supply free booklets on Common Diseases of Poultry for distribution among your clients. Write us now.*

---

## **ABBOTT LABORATORIES**

**North Chicago, Ill.**

**New York**

**Seattle**

**San Francisco**

**Los Angeles**

**Toronto**

ASHE LOCKHART  
*President and Treasurer*

J. J. GLOVER  
*Vice President*

M. M. LOCKHART  
*Secretary*

# ANNOUNCING

## THE ESTABLISHMENT OF A NEW BIOLOGIC PLANT

THOROUGHLY MODERN IN EVERY RESPECT. PLANNED,  
CONSTRUCTED AND EQUIPPED FOR THE PRODUCTION OF  
THE HIGHEST TYPE OF VETERINARY BIOLOGICS AT PRICES  
CONSISTENT WITH THOSE PREVAILING. UNEXCELLED  
DIAGNOSTIC FACILITIES.

### OWNED and OPERATED

BY DR. ASHE LOCKHART, WHO HAS BEEN ENGAGED IN BIOLOGIC  
PRODUCTION AND DIAGNOSTIC WORK FOR MANY YEARS,  
AND MANNED BY AN EXPERIENCED STAFF.

## CANINE DISTEMPER

### SERUM and ANTIGEN - HOMOLOGOUS

As originally announced by Dr. Lockhart—under the name Sero-Toxylin  
— now ready for distribution.

#### Code Word

Quill	Package	10 cc	Anti-Canine	Distemper	Serum (Homologous)	\$1.25
Quay	"	50 cc	"	"	"	\$5.00
Quest	"	2 cc	"	"	"	\$0.50

Also ready for distribution: clear hemorrhagic septicemia aggressin,  
clear blackleg aggressin, rabies vaccine, tuberculins, mallein, a complete  
line of bacterins, normal horse serum, sterile milk, pullorin, abortion  
antigen, pullorum antigen, at current prices. These will be followed  
by other standard biologics as soon as they can be produced.

### POLICY

SALES TO GRADUATE VETERINARIANS ONLY

# Ashe Lockhart, Inc.

800 WOODSWETHER ROAD

Kansas City,

-

-

-

Mo.





# OFFICIAL SERVICE

To the 1928 Convention

American Veterinary  
Medical Association

Minneapolis, Aug. 7 to 10

Lv. Chicago	10:35 a.m.	6:30 p.m.	8:45 p.m.	11:00 p.m.
Ar. Minneapolis	11:25 p.m.	7:35 a.m.	8:55 a.m.	11:55 a.m.

Lv. St. Louis	. . . . .	2:15 p.m.
Ar. Minneapolis	. . . . .	9:20 a.m.

Lv. Kansas City	. . . . .	12:10 Noon	C.B. & Q.
Ar. Omaha	. . . . .	6:30 p.m.	C.B. & Q.
Lv. Omaha	. . . . .	8:30 p.m.	C. G. W.
Ar. Minneapolis	. . . . .	8:15 a.m.	C. G. W.

For the accommodation of members of the A. V. M. A., special Pullmans will be carried on any or all of these trains to run through to Minneapolis.

*The Burlington is genuinely appreciative of its designation as the official route to the convention and will leave nothing undone to merit the confidence imposed in it.*

## RESERVATIONS

S. J. OWENS  
General Agt.  
179 W. Jackson Street  
Chicago

C. B. OGLE  
General Agt.  
416 Locust Street  
St. Louis

H. S. JONES  
General Agt.  
701 Walnut Street  
Kansas City

# Burlington

# Anthrax and its Prevention

**I**N 1917 THE LEDERLE ANTITOXIN LABORATORIES introduced Simultaneous Anthrax Vaccination in the United States. Millions of animals have since been effectively protected each year and this method must still be considered the most effective means of control.

Extensive comparative tests with simultaneous vaccination and other products have been conducted in the Laboratories and in the field. The results have always favored the simultaneous treatment.

The reinforcement of this immunity with stronger vaccines (Nos. 3 and 4) may be necessary in areas where the anthrax infection is very severe.

*Literature upon request*

**LEDERLE**  
ANTITOXIN  
LABORATORIES  
**NEW YORK**



THE pleasure resulting from work well done is worth while. To develop the best equipped railroad, to conduct the most successful bank, to create a great store where principle never yields to mere money-getting, to create an environment for the young man or woman just entering a business career that will be an incentive to do greater things, become a pleasure and remuneration far beyond a money value. . . . . Commercial business is the most fascinating in the world. It is as great a thing to develop merchandise of character and beauty as to paint a fine picture, carve a beautiful statue, or write a good book. To some manufacturers a carpet is just a carpet, a piece of gingham is only a piece of gingham. But with the desire to make the best—carpet or a piece of gingham can become a work of art.

—John G. Shedd.



# The Royal Serum Co.

Kansas City, U. S. A.

Aurora, Ill.  
Galesburg, Ill.  
Peoria, Ill.  
Indianapolis, Ind.  
Vincennes, Ind.

Omaha, Neb.  
Cedar Rapids, Ia.  
Des Moines, Ia.  
Sioux City, Ia.  
Mason City, Ia.

## CLASSIFIED ADS

**WANTED:** Position with small-animal practitioner by second-year student with B. S. A. Address: Roy West, James St., Guelph, Ontario.

**PRACTICE FOR SALE:** Have attractive proposition to offer to responsible veterinarian who has some capital to invest and is interested in small-animal practice. Practice had been established for nine years. Communicate with me immediately. Address: Dr. William R. Peelers, 1601 East Admiral Blvd. Tulsa, Okla.

**POSITION WANTED:** Graduate veterinarian, expert bacteriologist. For further details of training, experience, etc. Address: "Dr. F." c/o F. V. Kniest, Peters Trust Bldg., Omaha, Nebr.

**DOG ENCYCLOPEDIA:** All about dogs and all breeds—\$2.00. Dog World, monthly magazine, \$2.00 year. Any book on dogs sent C. O. D. Judy Publishing Co., 1922 Lake St., Chicago, Ill.

**FOR SALE:** A newly designed, small-animal operating-table, that is adjustable in height, sturdy, tilts and revolves. Price, fifty dollars. Also cages for cats. Address: Dr. H. C. Stephenson, Ithaca, N. Y.

**WANTED:** American Veterinary Review, Copies for April, 1901; November, 1908; November, 1911; April, 1913; January, 1914. Will pay thirty cents each for copies in good condition. American Veterinary Medical Association, 716 Book Bldg., Detroit, Mich.

**VETERINARY PRACTICE, POSITIONS, ETC.,** furnished and handled for sale in 48 States. Physicians, dentists, and nurses furnished and located. Drug stores for sale and drug positions in all States. F. V. Kniest, Peters Trust Bldg., Omaha, Nebr.  
Established 1904.

### WANTED

JOURNAL OF THE A. V. M. A.

July 1923

February 1926

February 1927

December 1923

January 1927

July 1927

*We will pay twenty-five cents each for copies in good condition. Please mail flat. All previous lists canceled.*

**AMERICAN VETERINARY MEDICAL ASSOCIATION**  
**716 BOOK BUILDING DETROIT, MICHIGAN**

### EAR TAG



### "MAKING ANIMAL TAGGING EASY"

The Ketchum Clincher Ear Tag is all STEEL, Self-Piercing and Self-Clinching and stays on. It is being rapidly adopted by Governments, Counties, Boards of Health and Veterinarians on MERIT. Once used has never lost a customer. Three sizes. Write for particulars.

**KETCHUM MFG. CO., Dept. D., Luzerne, N. Y.**

## FOR SALE

Bound Proceedings of the American Veterinary  
Medical Association

**ONE DOLLAR PER COPY**

(Postage Prepaid)

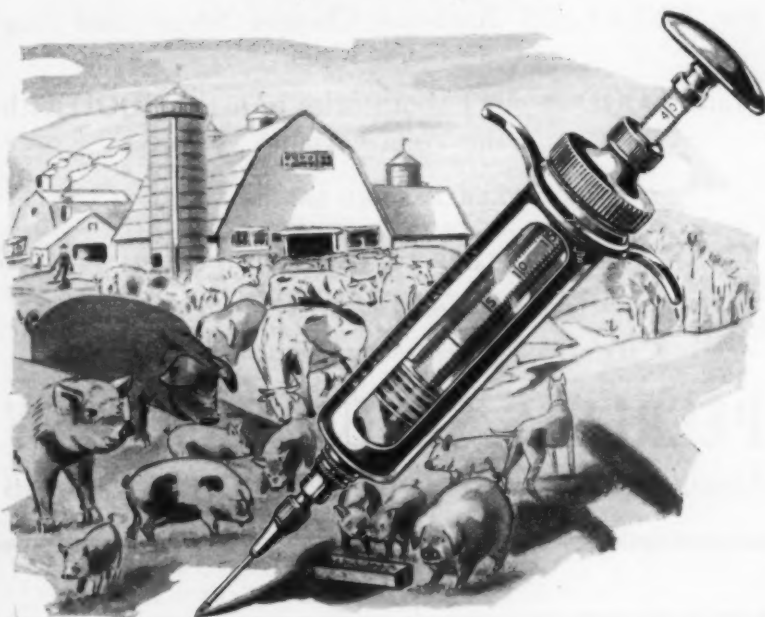
YEAR	COPIES	YEAR	COPIES
1906	1	1911	5
1908	2	1912	1
1909	3	1913	4
1910	1		

The 1913 volume was the last published. When the above are sold no more will be available. Fill in your set while you have the opportunity.

**AMERICAN VETERINARY MEDICAL ASSOCIATION**  
**716 Book Building DETROIT, MICHIGAN**

# B-D PRODUCTS

*Made for the Profession*



## HEAVY FIELD WORK

is made easier by using CHAMPION SYRINGES and NEEDLES.

Ease and speed of syringe operation, minimum breakage and keen-cutting Luer needles that can't jump off are some of the reasons why CHAMPIONS will please you.

*Sold Through Dealers*

Send Pocket catalog on Champion Syringes and needles to—

Name.....

Address.....

**BECTON, DICKINSON & CO.** <sup>IV4</sup>

RUTHERFORD, N. J.

*Makers of B-D Veterinary Thermometers, CHAMPION Syringes and Needles, MONARCH Milking Tubes and B-D Cattle SPECIALTIES*

## ANTI-HOG CHOLERA SERUM VIRULENT HOG CHOLERA VIRUS

Use **PEERLESS** Anti-Hog-Cholera Serum and Hog Cholera Virus.

Made **GOOD** in our Laboratories to make **GOOD** with the Veterinarians.

**PEERLESS RED SERUM**  
**PEERLESS CLEAR REFINED SERUM**  
**PEERLESS CLEAR CONCENTRATED SERUM**

*Order by wire at our expense.*

*We prepay express charges on all size orders.*

## PEERLESS SERUM COMPANY

Lyons and Water Sts., KANSAS CITY, KANSAS

WHEN OTHER TREATMENTS FAIL



# USE MAC

Mistura

Argenti

Composita

Accepted and used by the Veterinary Profession since 1900.  
FOR SPLINTS, SPAVING, CURBS, SIDE BONES, SHOE SOILS, OSSIFICA-  
TIONS, INFLAMED TENDONS, BURSAL LAMENESS, ETC.

### ADVANTAGES

Can be applied in a few seconds.  
Does not soil the hands.  
Does not blemish the horse.  
Horse may be used every day.  
Lower in price than imitations.  
Guarantee label may be detached  
leaving only your name.

### PRICES

Single bottle.....	\$ 2.00
1/2 doz. and one free.....	5.00
1/2 " " two ".....	8.00
1 " " four ".....	15.00
2 " " eight ".....	25.00

Manufactured and  
Fully protected by

**CARTER-LUFF CHEMICAL CO.,** Hudson,  
N. Y.

Write for our Free Offer.



# Anthrax Prophylaxis

## GOOD

Anthrax Simultaneous  
(10 cc Serum, 1 cc Spore)

## BETTER

Anthrax Aggressin  
(10-cc dose)

## BEST

Special No. 4  
(20 cc Serum, 2 cc Special Spore No. 4)

*In badly infected areas we advise the  
use of Special No. 4.*

100-cc bottle Anthrax Aggressin \$1.50

500-cc bottle Anthrax Aggressin \$7.50

# The Cutter Laboratory

Established 1897

Berkeley, California

# FOR THE VETERINARIAN

## Hi-Ko

HIGH CO-EFFICIENT  
TRADE MARK REG. U. S. PAT. OFF.

A SODIUM HYPOCHLORITE

### STABILIZED - STANDARDIZED

A RELIABLE ANTISEPTIC

A DEPENDABLE DISINFECTANT

AN EFFICIENT GERMICIDE

AN EFFECTIVE DEODORANT

*A Clear Colorless Liquid*

*Contains no acid or oil*

*Leaves no stain*

*No odor after use*

Address all Inquiries to

DR. J. I. GIBSON

*Consulting Veterinarian*

MANUFACTURED EXCLUSIVELY BY

## HILLYARD CHEMICAL CO.

ST. JOSEPH, MISSOURI, - - U. S. A.

Copyright 1929

# DO YOU KNOW

it is not often that anything *really* new is produced?

## KEN-L-TONE

THE NEW PRODUCT OF HEMOGLOBIN, MEAT AND LIVER  
EXTRACT COMPOUND

A VITALIZER OF EXCEPTIONAL MERIT

Particularly beneficial during and after distemper and in all  
convalescence

*Sold only to Veterinarians for their  
use and dispensing*

**CHAPPEL BROS., Inc., Rockford, Ill., U.S.A.**

MANUFACTURERS OF

**KEN-L-RATION PRODUCTS**

*The Dog Foods Supreme*



### May We Send You Free Samples?

For almost seventy-five years, Spratt's Foods have been sold, both here and abroad, largely on the recommendation of leading veterinarians who have been convinced by use in their own establishments of the high merit of Spratt's products.

We should be glad to send you, upon request, samples for trial in your own kennels and a complete description of our various dog foods, appliances and accessories. Please address

**SPRATT'S PATENT Ltd.**

Newark, N. J.      San Francisco, Calif.

## EAGLE SERUM

**Eagle Blood Serum  
Eagle Refined Clear Serum  
Eagle Concentrated Clear Serum  
Eagle Virulent Virus**

EAGLE SERUM is now produced in my new serum plant under U. S. Veterinary License No. 2 and the personal supervision of the owner, Dr. W. W. Eagle.

YOUR ORDERS WILL BE  
APPRECIATED

### The Eagle Laboratories

310 Central Avenue

KANSAS CITY, KANS.

Day Phone—Drexel 0383

Night Phone—Fairfax 0426

---

# Points About The VETERINARY JOURNAL

**I**T is the only monthly paper devoted to the study and practice of Veterinary Medicine published in the British Isles. It was founded in 1875.

**I**T especially caters for the practitioner, and has always endeavored to make a special study of daily clinical work.

**I**T contains the record of the scientific progress of the Veterinary Profession throughout the British Isles, India, Africa, Australia, New Zealand and Canada.

**I**TS editors are Mr. Frederick Hobday, C. M. G., F. R. C. V. S., F. R. S. E., who is Hon. Veterinary Surgeon to his Majesty the King, Fellow of the Royal Society of Medicine, and was formerly Professor in the Royal Veterinary College, London; and Mr. Gladstone Mayall, M. R. C. V. S., the author of numerous Veterinary and Agricultural textbooks.

**T**HERE is no other English periodical which covers so wide a field or presents a more valuable record of practical and scientific progress in Veterinary Literature.

**I**F you wish to keep up-to-date you cannot afford to leave such a valuable source of information untouched. Even if you pick up from its columns only one new hint, or one new and successful treatment during the year, you will be amply repaid for the expenditure of the small subscription involved.

**\$ 5.00, Post Free. Send Your Order**

**To**

**American Veterinary  
Medical Association  
716 Book Bldg.,  
Detroit, Mich., U. S. A.**

**Or**

**Messrs. Bailliere, Tindall & Cox  
8, Henrietta Street,  
Covent Garden,  
London, W. C. 2.**

## NOMINA ANATOMICA VETERINARIA

*Final Report of The Committee  
on Revision of Veterinary  
Anatomical Nomenclature.*

PRICE \$2.50 PER COPY

Published by  
**American Veterinary Medical  
Association**

716 Book Building, Detroit, Mich.

## Make Friends! USE



### *Certified Brand*

**ANTI-HOG CHOLERA SERUM,  
BIOLOGICS AND  
PHARMACEUTICALS**

*Sold to Graduates Only*

**NORDEN LABORATORIES**

U. S. Veterinary License No. 189.

GENERAL OFFICES - LINCOLN, NEBR.  
BRANCH - - - SIOUX CITY, IOWA

## 2-COMPLETE SETS-2

READY FOR BINDING

### JOURNAL

OF THE

### AMERICAN VETERINARY MEDICAL ASSOCIATION

*New Series, Volumes 1 to 25, Inclusive*

*Only Two Complete Sets Available*

PRICE ON APPLICATION

**AMERICAN VETERINARY MEDICAL ASSOCIATION**

716 BOOK BUILDING - - - DETROIT, MICH.

*Our Pledge to the Profession ~  
"Supreme Quality and Service"*



## ***Doubly Safeguarded for You ~***

You know *exactly* what you are using when you employ Fort Dodge biologics and pharmaceuticals, for you are doubly safeguarded—

- 1 By the exact formula, which *always* appears on the label.
- 2 By the national and international reputation of one of the oldest institutions catering exclusively to the Veterinary profession.

You don't guess when using Fort Dodge products—you KNOW!

# **FORT DODGE**

## **Serum Company**

Veterinary Biologics and Pharmaceuticals  
U. S. Veterinary License No. 112  
Fort Dodge, Iowa



## BROTHER VETERINARIAN

Missouri Valley Anti-Hog Cholera Serum and Virus

Produced by Veterinarians

Sold to Veterinarians

DOES THIS MEAN ANYTHING TO YOU?

If so

One of the following Service Stations can supply you

### SERVICE STATIONS

517 North Main Street	MISSOURI VALLEY SERUM COMPANY Dr. T. W. Johnston in Charge Phone, Day or Night, Main 1063W	Dayton, Ohio
607 North Oak Street	MISSOURI VALLEY SERUM COMPANY W. L. McCauley in Charge Phone, Day or Night, 1042	Creston, Iowa
901 West Third Street	MISSOURI VALLEY SERUM COMPANY Empire Laboratory in Charge Phone, 162	Muscatine, Iowa
726 Sycamore Street	MISSOURI VALLEY SERUM COMPANY Drs. Kerr & McKellar in Charge Phone, Day or Night, 488	Waterloo, Iowa.
610 South Third Street	MISSOURI VALLEY SERUM COMPANY Dr. G. J. Behrens in Charge Phone, Day or Night, Main 518J	Evansville, Indiana
428 East Washington Boulevard	DR. GEO. W. GILLIE Day Phone, Anthony 2388—Night Phone, Anthony 88365	Fort Wayne, Indiana
603 Main Street	DR. NOEL C. ELBERSON Phone, 1415	Anderson, Indiana
6 South Third Street	DR. WALTER L. HADLEY Day Phone, 930—Night Phone, 690	Lafayette, Indiana
27 West North Street	DANVILLE WHOLESALE DRUG COMPANY Day Phone, Main 654—Night Phone, Main 2166W	Danville, Illinois
136 North 3rd Street	MEMPHIS SERUM COMPANY Phone, Day or Night, Main 6181	Memphis, Tennessee
Washington Avenue, opposite Post Office	CLOYS SERUM COMPANY Day Phone, 159—Night Phone, 510W	Union City, Tennessee

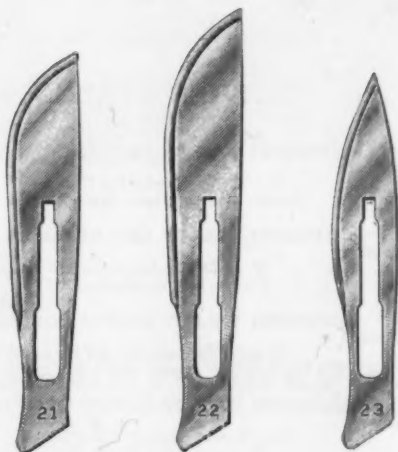
### MISSOURI VALLEY SERUM COMPANY

50 North Second St. Kansas City, Kansas.  
Day Phone, Main 6661—Night Phones, Drexel 2797 or Drexel 2445

*Our prices are no higher than those of other reputable firms.*

# BARD-PARKER KNIFE

*It's Sharp*



The Veterinarian, with a set of Bard-Parker Knives, [is prepared for every emergency. Price—No. 4 handles, \$1.00 each. Blades—all sizes, six of a size per package, \$1.50 per dozen.



Set No. 105, one No. 4 handle and six each of Nos. 20, 21, 22 and 23 blades in leather case—\$5.75.

**BARD-PARKER COMPANY, INC.**  
150 Lafayette Street. New York. N.Y.





**I**T affords pleasure to announce that the following named individuals, comprising the entire sales and production forces of the company, have acquired by purchase the full responsibility for the future conduct of the business: G. H. Williams, Dr. A. C. Drach, Dr. G. E. Whipple, Dr. H. C. Utley, L. H. Ouren, Dr. H. T. Corbet, Dr. Fred Barta, Dr. R. T. White, Dr. G. B. Fincham, Dr. J. C. Schoenlaub and Dr. W. H. McKenzie.

There will, of course, be no changes in any of the well-known "Corn States" policies. The service of live stock husbandry through exclusive cooperation with graduate, licensed veterinarians will be carried further in every possible way. Production will continue under the same veterinary staff.

Although splendidly equipped to serve its clientele most satisfactorily from every standpoint of quantity and quality of product, the most treasured asset of the company is the confidence and good will of the veterinary profession. It will continue to be the primal purpose of the individuals named above to return many fold this confidence and good will in the terms of genuine service rendered.

**THE CORN STATES SERUM CO.**

**OMAHA, U. S. A.**

CP2  
**Jen-Sal**

## PREVENT RABIES

Vaccination offers the only successful means of preventing Rabies in exposed animals or man



### *Dosage Before Exposure*

As an immunizing agent before exposure, we recommend 5 cc for dogs and 10 cc for large animals.

### *Dosage After Exposure*

After exposure we recommend six daily injections of the regular prophylactic dose as follows: for small animals, 6 5-cc doses Rabies Vaccine; for large animals, 6 10-cc doses Rabies Vaccine.

### PRICES

#### *Code Word*

Gate	Per 5-cc vial.....	\$0.30
Gatrod	Per package, six 5-cc vials.....	1.50
Gatlay	Per 50-cc vial.....	2.00
Less 5% cash discount		

As a means of calling the attention of the owners to the importance of protective vaccination against Rabies, we will furnish postal-card forms to send dog-owners, also an office placard; and with each treatment we furnish a certificate of vaccination to give to the dog-owner, and a metal tag with link to be attached to the dog collar, bearing the inscription, "Received Jen-Sal Rabies Vaccine 1928."

**JENSEN-SALSBERY LABORATORIES INC.**  
KANSAS CITY, MO.



